Über dieses Buch

Dies ist ein digitales Exemplar eines Buches, das seit Generationen in den Regalen der Bibliotheken aufbewahrt wurde, bevor es von Google im Rahmen eines Projekts, mit dem die Bücher dieser Welt online verfügbar gemacht werden sollen, sorgfältig gescannt wurde.

Das Buch hat das Urheberrecht überdauert und kann nun öffentlich zugänglich gemacht werden. Ein öffentlich zugängliches Buch ist ein Buch, das niemals Urheberrechten unterlag oder bei dem die Schutzfrist des Urheberrechts abgelaufen ist. Ob ein Buch öffentlich zugänglich ist, kann von Land zu Land unterschiedlich sein. Öffentlich zugängliche Bücher sind unser Tor zur Vergangenheit und stellen ein geschichtliches, kulturelles und wissenschaftliches Vermögen dar, das häufig nur schwierig zu entdecken ist.

Gebrauchsspuren, Anmerkungen und andere Randbemerkungen, die im Originalband enthalten sind, finden sich auch in dieser Datei – eine Erinnerung an die lange Reise, die das Buch vom Verleger zu einer Bibliothek und weiter zu Ihnen hinter sich gebracht hat.

Nutzungsrichtlinien

Google ist stolz, mit Bibliotheken in partnerschaftlicher Zusammenarbeit öffentlich zugängliches Material zu digitalisieren und einer breiten Masse zugänglich zu machen. Öffentlich zugängliche Bücher gehören der Öffentlichkeit, und wir sind nur ihre Hüter. Nichtsdestotrotz ist diese Arbeit kostspielig. Um diese Ressource weiterhin zur Verfügung stellen zu können, haben wir Schritte unternommen, um den Missbrauch durch kommerzielle Parteien zu verhindern. Dazu gehören technische Einschränkungen für automatisierte Abfragen.

Wir bitten Sie um Einhaltung folgender Richtlinien:

+ *Nutzung der Dateien zu nichtkommerziellen Zwecken* Wir haben Google Buchsuche für Endanwender konzipiert und möchten, dass Sie diese Dateien nur für persönliche, nichtkommerzielle Zwecke verwenden.

+ *Keine automatisierten Abfragen* Senden Sie keine automatisierten Abfragen irgendwelcher Art an das Google-System. Wenn Sie Recherchen über maschinelle Übersetzung, optische Zeichenerkennung oder andere Bereiche durchführen, in denen der Zugang zu Text in großen Mengen nützlich ist, wenden Sie sich bitte an uns. Wir fördern die Nutzung des öffentlich zugänglichen Materials für diese Zwecke und können Ihnen unter Umständen helfen.

+ *Beibehaltung von Google-Markenelementen* Das "Wasserzeichen" von Google, das Sie in jeder Datei finden, ist wichtig zur Information über dieses Projekt und hilft den Anwendern weiteres Material über Google Buchsuche zu finden. Bitte entfernen Sie das Wasserzeichen nicht.

+ *Bewegen Sie sich innerhalb der Legalität* Unabhängig von Ihrem Verwendungszweck müssen Sie sich Ihrer Verantwortung bewusst sein, sicherzustellen, dass Ihre Nutzung legal ist. Gehen Sie nicht davon aus, dass ein Buch, das nach unserem Dafürhalten für Nutzer in den USA öffentlich zugänglich ist, auch für Nutzer in anderen Ländern öffentlich zugänglich ist. Ob ein Buch noch dem Urheberrecht unterliegt, ist von Land zu Land verschieden. Wir können keine Beratung leisten, ob eine bestimmte Nutzung eines bestimmten Buches gesetzlich zulässig ist. Gehen Sie nicht davon aus, dass das Erscheinen eines Buchs in Google Buchsuche bedeutet, dass es in jeder Form und überall auf der Welt verwendet werden kann. Eine Urheberrechtsverletzung kann schwerwiegende Folgen haben.

Über Google Buchsuche

Das Ziel von Google besteht darin, die weltweiten Informationen zu organisieren und allgemein nutzbar und zugänglich zu machen. Google Buchsuche hilft Lesern dabei, die Bücher dieser Welt zu entdecken, und unterstützt Autoren und Verleger dabei, neue Zielgruppen zu erreichen. Den gesamten Buchtext können Sie im Internet unter `http://books.google.com` durchsuchen.

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

https://books.google.com

Digitized by Google

THE UNIVERSITY
OF ILLINOIS
LIBRARY

625.05
SR
v.74

ENGINEERING

Digitized by Google

The person charging this material is responsible for its return to the library from which it was withdrawn on or before the **Latest Date** stamped below.

Theft, mutilation, and underlining of books are reasons for disciplinary action and may result in dismissal from the University.

UNIVERSITY OF ILLINOIS LIBRARY AT URBANA-CHAMPAIGN

BUILDING USE ONLY

JUL 17 1976

JUL 17 1976

L161—O-1096

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Electric Railway Journal

INDEX

to Volume 74

January to December, 1930

McGraw-Hill Publishing Company, Inc.
Tenth Avenue at Thirty-sixth Street
New York City

Digitized by Google

Getting the Most from the

INDEX

THIS is essentially a subject index, rather than an index of titles. An article treating a number of different subjects is listed under each of them. In addition, a geographical reference is published wherever the article relates to a particular railway, city, state or country. Entries about an electric railway in the United States or Canada are listed under the name of the city in which the main office of the company is located. Foreign railways are listed under the country.

In the subject index, an alphabetical arrangement is followed. If there is a choice of two or three keywords, the one most generally used has been selected, cross references being supplied. Below is given a list of keywords arranged under a number of major topics.

As an example of how to use the index, if a reader wishes to locate an article on car design, he would look in the list below at the general topic, "Rolling Stock." Under this topic, the heading, "Car Design and Car Orders," would apply to the article in question. This heading will be found under the letter "C" in the index, with individual articles separately listed.

In addition to the groups of articles covered by these headings, papers and reports from electric railway and other associations are grouped under the names of the various organizations. Biographical information is listed in the personal index.

Signed articles also are indexed by the name of the author. When the name of the author is known to the reader, this supplies the simplest method of locating the article.

Classified List of Keywords

Rolling Stock

Buses, (See motor buses)
Car design and car orders
Carhouses and storage yards
Electric equipment of cars
Motors
Locomotives
Maintenance, general
Maintenance practices and devices
Noise reduction
Trolley bus

Motor Buses

Garages
Motor bus design
Motor buses, general
Motor buses, gas-electric
Maintenance practices and devices

Power

Electrolysis
Maintenance practices and devices
Overhead contact systems
Power, general
Power distribution
Rectifiers
Substations and equipment

Way and Structures

Carhouses and storage yards
Maintenance practices and devices
Pavements
Track construction
Snow and ice removal

Transportation and Traffic

Accidents and accident prevention
Advertising
Employees
Fares and fare collection
Merchandising transportation
Operating records and costs
Parking of automobiles
Rapid transit
Schools
Signals
Snow and ice removal
Street traffic congestion
Traffic regulation
Transportation, general
Transportation, metropolitan

General and Miscellaneous

Accounting
Book reviews
Brady Safety Award
Coffin Award
Conspectus of Indexes
Fare increases and decreases
Financial
Franchises
Freight and express
Heavy electric traction
Insurance
Legislation and legal matters
Management
Market conditions
Modernization
Operating records and costs
Patents
Public relations
Rapid Transit
Schools
Statistics
Standardization
Stores
Taxation
Taxicabs
Transportation, general
Transportation, metropolitan
Trolley bus

Digitized by Google

625.05
SR
v. 74

INDEX TO VOLUME 74

PAGES BY ISSUES

January ..... 1 to 64
February ..... 65 to 124
March ..... 125 to 178
April ..... 179 to 244
May ..... 245 to 300
June ..... 301 to 35-
June 14 ..... 355 to 426
July ..... 427 to 496
August ..... 497 to 554
September ..... 555 to 610
October ..... 611 to 668
November ..... 669 to 728
December ..... 729 to 786

6-8-32 E9

A

Accidents and accident prevention:
—Blind accidents and how to handle them [Giltner], 470.
—Boston, Mass.:
Scientific analysis brings practical results, *68.
—Brady awards (ed), 66, *68, 165, 171, 457.
—Chicago, North Shore & Milwaukee R.R.:
First serious accident in ten years, 171.
—Claims men discuss witness statements, 468.
—Cleveland, Ohio:
Causes analyzed, 152.
—El Paso, Tex.:
Record improved, 73.
More passengers and fewer accidents, 449.
—Fraudulent claims investigated [Hellmuth], 469.
—171 interstate lines report accident figures, 292.
—Kansas City, Mo.:
Record bettered, 426.
—Louisville, Ky.:
New attitude on safety, *73.
—Safety devices aid in reducing accidents [Butler], *383.
—Securing the facts [McClain], 470.
—Short signal cycles speed traffic and reduce accidents [Bibbins], 631.
—Tampa, Fla.:
Record improved, *71.
—Washington, D. C.:
"Dark period" before sunrise creates hazard, 152.
—Wilmington, N. C.:
Tide Water Power Co. extends safety work, 72.

Accounting:
—Accountants committee work, 482.
—Accountants give attention to budgetary control, 471.
—Auditor as an analyst [Vickers], 472.

Advertising:
—Baltimore, Md.:
United Railways & Electric Co. distributes picture map, *190.
—Banker co-operates with transportation ad, *423.
—Binghamton, N. Y.:
Poster competition successful, 289.
—Cincinnati, O.:
Procter & Gamble Co. street car posters, *169.

Advertising:
—Cincinnati, O. (Continued):
Novel merchandising plan of Cincinnati Street Railway, *657.
—Des Moines, Iowa:
Extensive rehabilitation [Wingerter], *736.
—Harvard award to Westinghouse Electric & Mfg. Co., 236.
—Ice cars advertise product of railway subsidiary, *632.

Akron, Ohio:
—Northern Ohio Power & Light Co.:
Temporary franchise extended, 345.
Through limited bus service suggested, 234.
Segregation of properties, 423, 488.
Withdraws from operation in Canton, 346.
—Ohio Edison Co.:
Announcement made of merger of Ohio companies, 545.

Albany, N. Y.:
—United Traction Co.:
New car design [Beers], *78.
Receivers appointed, 58.

Allegheny Valley Street Railway (See Pittsburgh, Pa.)

Allentown, Pa.:
—Lehigh Valley Transit Co.:
New cars, *726.
Package service 113

Alliance, Ohio:
—Stark Electric Railway:
Grade crossing for heavy vehicular traffic, *705.
System being improved, 64.
Work car equipped to spread material along track, *765.

American Electric Railway Association:
—Abstracts of committee reports, *474.
—Accomplished results, 427.
—Advisory Council activities outlined, 444.
—Brady awards for accident prevention, *68.
—Committees active during the year, 474.
—Cooperation is essential [Shoup], *431.
—Executive commitee meets, 84, 233, 445, 715, 761.
—Lower fire insurance rates in effect, 74.
—Manufacturers show confidence in the industry (ed), 730.
—Newly-elected presidents of American and affiliated associations, *430.
—Opportunity for utilizing art of drama (ed), 429.
—Program of San Francisco convention, 326 (ed), 303.
—Report of managing director [Gordon], *437.
—San Francisco convention, 433, (ed) 427.
—Transportation men are community builders [Curtiss], *440.

American Electric Railway Accountants Association:
—Abstracts of committee reports, *482.
—Report of convention, *471.

American Electric Railway Claims Association:
—Abstract of committee reports, *483.
—Report of convention, *468.

American Electric Railway Engineering Association:
—Abstract of committee reports, *477.
—Economics, methods and new designs studied, 462, (ed) 478.
—January meeting, 77.
—Noise on the defensive (ed), 67.
—To seek formula on suitable vehicle, 600.

American Electric Railway Transportation and Traffic Association:
—Abstracts of committee reports, *480.
—Program announced, 57.
—Studies industry's fundamental problems, 459, (ed) 428.

American Institute of Electrical Engineers:
—Meeting considers railroad electrification, 682.
—To revise standards for control apparatus, 562.

American Road Builders' Association:
—Report on street railway paving, 143.

American Society for Testing Materials:
—Cement specifications revised, 626.

Anderson, Ind.:
—Indiana Railroad succeeds to Union Traction, 544.
—Union Traction Co. of Indiana:
Receiver would sell, 344.

Argentina:
—Buenos Aires new subway, 688.
—Mendoza Empresa de Luz y Fuerza acquired by American & Foreign Power, 547.

Atlanta, Ga.:
—Georgia Power Co.:
Ball bearing for brake handle [McAloney], *223.
Combination tie plate [Yeates], *108, correction, 163.
Economical rerailing [Berman], *766.
Hammer operated by compressed air [Pirkle], *225.
Net revenue increased 400% in five years, *673.
Special work built in place [Yeates], *339.
Spray equipment for weed killing [Pirkle], *104, correction, 163.
Supreme Court upholds lower court's decree, 345.
Switch tongues built up by welding [Picklesimer], *283.
Track construction experience, *191.
Track sand stored by compressed air [Yeates], *590.
Welding and cutting equipment [Hayes], *162.

Austria:
—Vertical motors feature locomotives, *511.

B

Baltimore, Md.:
—Survey to show shifts of business, 310.
—United Railways & Electric Co.:
Brief description of cars ordered, 354.
Built-up compromise joint [Bragg], *282.
Car-rider publication, 621.
Contracts awarded for new cars, 243.
Dam for weld metal [Haberam], *225.
Distributes picture map, *190.
Extensive rolling stock rehabilitation [Locke & Clark], *248.
Financial report, 658.
Introduces its new rolling stock, *599.
More buses ordered for Baltimore Coach Co., 496.
Old rail makes satisfactory whistle post [Hysan], *591.
Orders placed for 10 double-deck buses and 50 new cars, 178.
Safety zone markers, installing [Davis], 341.
Substation wins architectural prize, *131.
Supreme Court's rate decision, 75, (ed) 65.
Switch mate redesigned [Davis], *534.
Track construction experience, 271.
Trolley wire break record, *48.

Beacon, N.Y.:
—Fishkill Elec. Ry.:
Buses substituted for cars, 59.

Beaumont, Texas:
—Eastern Texas Electric Co.:
Abstract of Coffin Contest brief, 453.

Binghamton, N. Y.:
—Poster competition successful, 289.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

307576

Digitized by Google

Birmingham, Ala.:
—Birmingham Electric Co.:
Insulation tested with portable transformer [Taurman], *763.
Track construction experience, *191.
Trolley wire break record, *48.

Bonus (See Employees)

Book reviews:
—Annual safety congress transactions, 172.
—Conditional sales—Law and local practices for executive and lawyer, R. S. Hoar, 172.
—Co-ordinated Motor-rail-steamship transportation. G. Lloyd Wilson, 603.
—Electric system handbook, ed. by Clarence H. Sanderson, 172.
—Electrical distribution engineering, H. P. Seelye, 718.
—Electrification of steam railroads, Kent T. Healy, 172.
—Elektrische Bahnen, D. O. Horing, 172.
—High voltage oil circuit breakers, Roy Wilkins, 603, 718.
—Life expectancy of physical property based on mortality laws, E. B. Kurtz, 718.
—New York Association's work, 172.
—An outline of principles and practical methods for traffic control of value to all American Cities. 603.
—Planning the future of the New York Region, R. L. Duffus, 172.
—Problems in public utility management, Philip Cabot, 603.
—Public Utility control in Massachusetts, I. R. Barnes, 603.
—Railroad statistics report, 172.
—Techno-Dictionary, English-German-Italian, 718.
—Uniform paved track, International Steel Tie Co., 170.

Boston, Mass.:
—Boston Elevated Ry.:
Accident analysis successful, *68.
Building concrete track with minimum interruption of service, *101.
Celebrate Tercentenary of Boston, 601.
Repairing 900 cars a year in the shop, *330.
Track construction experience, *191.
Trolley wire break record, *48.
Vote on future of railway, 545.
Washing buses in record time [Mackay], *340.
—Boston, Revere Beach & Lynn R.R.:
Increase in fare authorized, 236.
—Eastern Massachusetts Street Railway:
Equipment for overhead maintenance modernized, *336.
Snow removal practice, 676.
Track construction experience, *191.

Brady Safety Award:
—Award for 1928, *68, (ed) 66, 171.
—Awards for 1929, 457.
—Scope broadened, 165.

Brooklyn. (See New York City)

Buffalo, N. Y.:
—International Ry.:
Deep crankcase pans, *103.
Field testing and taping, *163.
New snow fighting methods, *231.
Snow removal practice, 676.

Buses (See Motor Buses)

C

Calgary, Alberta:
—Calgary Municipal Railway wins honorable mention in Brady award, *457.

Canadian Electric Railway Association:
—Convention held at Ottawa, *627.
—Program for meeting, 541.
—Statistical report on Canadian properties, 630.

Canton, Ohio:
—Northern Ohio Power & Light Co.:
Withdraws from operating lines, 346.

Car design and car orders:
—Air-magnetic brakes make quick stops [Davis], *256.
—Albany, N. Y.:
New car of United Traction Co. [Beers], *78.

Car design and car orders (Continued):
—Allegheny Valley Street Railway:
Complete replacement on Allegheny Valley route, *150.
Comfort and speed on new cars [Inglis], *242.
—Aluminum for car construction [Faust], *184.
—Aluminum reduces motor weight, *576.
—Baltimore, Md.:
Brief description of cars ordered by United Rys. & Elec. Co., 354.
Order placed for 50 cars and 10 double-deck buses, 178.
Rolling stock rehabilitation [Locke and Clark], *248.
—British Columbia Electric Railway:
Aluminum alloys reduce weight of new cars, *123.
Details of new cars, 63.
—Brooklyn & Queens Transit Co.:
New cars in service, *242.
—Chicago, North Shore & Milwaukee Railroad:
New cars, *243.
—Cincinnati & Lake Erie R.R.:
New de luxe cars, *614.
Receives new cars, *494.
—Comfort and convenience in cars [Otis], *379.
—Des Moines Railway:
Specifications of new cars, 495.
—Detroit Dept. of Street Railways:
Brief description of cars ordered, 353.
New cars delivered, *608.
—Dresden, Germany:
Articulated cars tested, *572.
—Economies of high speed motors [Bethel], *465.
—Edmonton Radial Ry.:
New cars ordered, 609.
—Faster schedules in rapid transit service [Clardy], *257.
—General Car & Coach Co.:
New standardized, light weight car, *767.
—Higher accelerating and braking rates (ed), 247.
—Hydro Electric Power Commission:
New cars for Windsor, 63.
—Improvement in the ride is the most effective stimulant of public interest [Gordon], 360.
—Improving design to improve service (ed), 355.
—Increasing speed through analysis (ed), 499.
—Knoxville Power & Light Co.:
Specifications of cars ordered, 353.
—Lehigh Valley Transit Co.:
New cars, *726.
—London County Council Tramways:
New low-level cars, *687.
—Long Island Railroad:
Cars received, 785.
Orders placed for new equipment, 494.
—Lowering cost by reducing noise [Williams], *376.
—Lubrication for roller bearings, *109.
—Making faster operation practicable (ed), 730.
—Milwaukee Elec. Ry. & Lt. Co.:
New train equipment received, 353.
—Mobile Light & R.R. Co.:
Brief description of cars ordered, 354.
—Modern vehicles and equipment [Burleson], *466.
—Monroe Municipal St. Railway:
Receives new cars, 494.
—New braking apparatus demonstrated, 562.
—New York City:
New subway cars, 488.
—Northern Indiana Railway:
Brief description of cars ordered, 298, 353.
—Northwestern Pacific R.R.:
Orders new rolling stock, 494.
—Orders placed during 1929 [van der Stempel] 33.
—Oklahoma Railways—cars described, 609.
—Philadelphia Rapid Transit Co.:
Sample car of new type, *741.
—Presidents' Conference Comm. to develop plans for improving design (ed) 428, [Conway], 438.
—Safety devices aid in reducing accidents [Butler], *383.
—St. Louis, Mo. Public Service Co.:
Sample car, *105.
—Selection of motor control [Beers], 575.
—Simpler car parts proposed, 170.
—Simplicity and utility in design [Graham], *363.
—Speed an essential of street car performance [Rossell], *368.
—Supply car for B.-M. T. System, *227.
—Terre Haute, Indianapolis & Eastern Traction:
Parlor-buffet service car, *208.
—Timidity a bar to progress in design (ed), 612.
—Wheel, demountable, *110.
—Windsor, Essex & Lake Shore Railway:
Specifications for new cars, 495.
Modern design features Windsor cars, *565.
—Yakima Valley Transportation Co.—new cars, *299.

Car design and car orders (Continued):
—York Railways:
Receives three new cars, 785.
—Youngstown Municipal Railway:
Details of new cars, 63.
Speedy, light-weight cars [Graham], *267.

Carhouses and storage yards:
—Detroit, Mich.:
Department of Street Railways—new carhouse, *702.

Central Electric Railway Accountants' Association:
—Arrangement for meeting, 486.

Central Electric Railway Association:
—Meeting—analyzes condition of the industry, 506.
—More business and how to get it, 89.

Central Electric Railway Master Mechanics Association:
—Discuss equipment at meeting, 276.
—Have varied program, *641.

Charlotte, N. C.:
—Southern Public Utilities Co.:
Preventing grease from entering motor bearing [Osborn], *224.

Chicago, Ill.:
—Chicago, North Shore & Milwaukee Railroad:
Car washer, *322.
New cars, *243.
—Chicago Rapid Transit Co.:
Improvement bonds approved, 658.
New shop unit, *566.
Temporary financing proposed, 600.
—Chicago, South Bend & Northern Indiana Railway—Financial situation (ed), 127.
Reorganized, 168.
—Chicago, South Shore & South Bend Railroad:
New shop building started, 299.
—Chicago Surface Lines:
Feeder bus controversy to be settled, 59.
Largest trolley bus system, *272.
Operating statistics prove success of trolley buses [Forty], *563.
Orders trolley buses, 244.
Steel poles used for trolley bus system, *317.
Suspends car-and-trailer operation, (ed) 613, *640.
Transfer demand deferred, 55.
Trolley buses received, *784.
Trolley wire break record, *48.
—Co-ordination ahead for Chicago (ed), 429.
—Subway plans started, 540.
—Unification franchise almost ready, 288.
—Unification franchise approved by voters, 486.
—Unification ordinance ready for voters, 342.
—Unified transportation development, *500 (ed), 497.

Cincinnati, Ohio:
Emergency dolly [Jonas], *160.
Modern machinery for better maintenance [Jonas], *418.
Negotiations about floating debt, 169.
Novel merchandising plan, *657.
Tilting bench for controller repairs [Jonas], *283.

Cleveland, Ohio:
—Cleveland Railway:
Abstract of Coffin Contest brief, 450.
Accident causes analyzed, 152.
Accurate work schedules permit speedy track reconstruction [George], *278.
Adjustable hanger for switch contactors [Brown], *708.
Belt conveyor for loading concrete mixer [Spenzer], *536.
Blinker light protects linemen on night work [Reinker], *651.
Boring of motor axle bearing seats [Greer], *650.
Brake hangers, jig for drilling [Scullis], *341.
Brake lining selected by test results [Stevens], *647.
Bus hood clamp locks easily [Rose], *588.
Center control for temporary block signal [Brown], *648.
Clamp for installing field coils [Dumke], *704.
Connecting rod boring tool [Rose], *646.
Connecting rod for tongue switches [Spenzer], *162.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

Digitized by Google

Cleveland, Ohio:
—Cleveland Railway (Continued):
Contract line, renewal of [Scott], 709.
Contributory pension plan, 581.
Convenient machine for armature removal [Scullin], *648.
Cylinder boring device for air compressor [Sohl], *651.
Dog holds armature pinion [Leary], *648.
Double air chuck for tires [Grant], *160.
Double-milling rail heads to prevent cupping at joints [George], *103.
Electrically heated inspection lamps [Reinker], *161.
Fare controversy, 600.
Fare increases, 52.
Feeler gages [Stevens], *706.
Filling sweeper broom blocks by machine [Scullin], *706.
Flashing lights on tower trucks [Brown], *282.
Gage makes wheel mounting easy [Scullin], *708.
Gun for track switch lubrication [Brown], *286.
Hood rims and carlins reshaped [Davidson], *163.
Increased allowance, 292.
Ingenious jig speeds brake head drilling [Niederst], *651.
Instruction school for linemen [Scott], *586.
Leveling bar facilitates joint alignment [Anthony], *591.
Lighted brooms help cleaners [Stevens], *226.
Long level, one-man [Evans], *104.
Loosening tight wires in conduit [McIntosh], *587.
Maintenance award given by Electric Railway Journal, 644.
More power [Welsh], 750.
Overhead for temporary crossovers [Scott], *533.
Oversize bearing housings bored in jig [Niederst], *650.
Oxyacetylene apparatus [Copeland], *226.
Pavement straight edge [Costello], *104.
Portable jack for bus tools [Palmer], *531.
Pump and heater facilitate transmission filling [Rose], *764.
Repairing switches for portable crossovers, [Spenzer], *707.
Safety arm for coal and sand bin lids [App], *649.
Scaffold for car washing [Sohl], *535.
Selling an idea to the foreman [George], 519.
Signal bell on tower truck [Brown], *221.
Snow removal practice, *676.
Stand for bus motor adjustment [Stevens], *284.
Steel plate safety shoes fitted to ladders [Scullin], *589.
Switch, tongue [Spenzer], *338.
Thawing frozen pipes [Brown], *217.
Towing and spacer bar for disabled buses [Piwonka], *647.
Track construction experience, *191.
Trailers dropped on Lorain Ave. line, 599.
Treated ties safely handled [Evans], *649.
Trolley wire break record, *48.
Two-cent fare zone (ed), 557.
Two-faced compass determines motor field polarity [Dumke], *650.
Use of dynamometer successful in stringing trolley wire [Scott], 281.
Warning lights on tower wagons [Scott], *339.
Wheel nut wrench [Kehoe], *337.
Window guard painting machine [Scullin], *283.
Wins partial victory for no zone cabs in Cleveland, 601.
—Cleveland Union Terminals Co.:
Motor generators supply power for terminal electrification [McDonald], *633.

Coffin Award:
—Award won by Youngstown Municipal Railway, 446.
—Abstract of brief presented by Cleveland Railway, 450.
—Abstract of brief presented by Community Traction Co., 452.
—Abstract of brief presented by Eastern Texas Electric Co., 453.
—Abstract of brief presented by El Paso Electric Co., 449.
—Abstract of brief presented by Union St. Railway, 448.
—Brief review of theme of award, 546.
—Comments on, 427.

Colorado Springs, Col.:
—Brady award won by Col. Spgs. & Int. R.R., *457.

Columbia, S. C.:
—Columbia Railway Gas and Electric Co.:
Case before Supreme Court, 116.
—U. S. Supreme Court orders railway service to be resumed, 342.

Columbus, Ohio:
—Columbus Railway, Power & Light Co.:
Another fare proposed, 171.
Reduction in current rates hinges on fare increase, 234.
—Scioto Valley Railway & Power Co.:
Proposed abandonment under inquiry, 545.

Community Traction Co. (see Toledo, Ohio)

Connecticut Co. (See New Haven, Conn.)

Conspectus of Indexes:
—Conspectus of Indexes, 58, 118, 170, 234, 292, 346, 488, 546, 661, 718.

D

Dallas, Texas:
—Dallas Railway & Terminal Co.:
Copper and mica dust collected on commutator slotter [Beadle], *707.
Grease ring protects commutators on ball-bearing motors [Beadle], *590.
Holder for armature dipping [Traw], *161.
Preventing loose breaker tips [McGinnis], *285.
Test for partial open circuit [Beadle], *536.
Testing air governors [McGinnis], *766.
Wheel grinding economical [Freeman], *341.
—Texas Electric Railway:
New locomotives facilitate freight handling [Silvus], *260.

Dayton, Ohio:
—Cincinnati & Lake Erie Railroad:
City Commission rejects C. & L. E. R.R. proposal, 234.
Dispute, 346.
New de luxe cars challenge the steam railroad and the bus, *614.
Receives new cars, *494.
Receives new freight cars, *298.
Sells its power lines, 56.
Through operation begun, 52.

Delaware, Lackawanna & Western R.R.:
—Electric suburban service planned, 543.
—Scheduled speed increased by electrification, *683.
—Switching locomotive added, *726.

Denmark:
—Experimental cars for Copenhagen, 710.

Des Moines, Iowa:
—Des Moines Railway:
Extensive rehabilitation [Wingerter], *736.
Specifications of new cars, 495.

Detroit, Mich.:
—Department of Street Railways:
Brief description of cars ordered, 353.
Center bearing lubrication [Williams], *285.
City Council refuses to approve contract, 346.
Exhaust gas fumes discharged from roof of bus, *587.
Express service popular [Faust], *85.
Fare increases, 165 (ed), 127.
High voltage equipment test [Williams], *226.
New carhouse built, *702.
New cars arrive, *608.
Parking service popular, *582.
Snow removal practice, *676.
Track construction experience, *191.
Trolley buses to have opening ceremonies, 425.
Trolley bus operation, *753.
Trolley wire break record, *48.
—Eastern Michigan Railways:
Pressure lubrication of trolley wire, *284.

Duluth, Minn.:
—Duluth Street Railway:
Seeks to restrain bus competitor, 345.
—Duluth Street Railway (Continued):
Snow removal practice, *676.
Wins Brady award, *457.

E

Eastern Massachusetts Street Railway (See Boston, Mass.)

Edmonton, Alberta:
—Edmonton Radial Railway:
New cars ordered, 609.

Electrical equipment of cars:
—Field shunting switch, *769.
—Light weight trolley base, *593.
—Regenerative system successful in Paris, *757
—Signal lights for stop warning, *770.
—Shunting motors for greater speed [Beers] 535.
—Terminal for brush holder leads, *286.
—Thermostat for heat control, 770.

Electric Railway Association of Equipment Men, Southern Properties:
—Analyze maintenance practices, 118.
—Semi-annual meeting, 344.

Electric Railway Journal:
—Awards for first period of maintenance contest, *159.
—Awards for second period of maintenance contest, *329.
—Awards for third period of maintenance contest, *645.
—New maintenance contest announced, 701.

Electrification: (See Heavy Electric Traction):

Electrolysis:
—Checked by potential wires in Winnipeg [Stewart], *338.

El Paso, Texas:
—El Paso Electric Co.:
Abstract of Coffin Contest brief, 449.
Accident prevention, 73.
Selling tickets from house to house, 233.

Employees:
—Bonus plan works well on N. Y. & Queens County Railway, 513.
—Cleveland Railway has contributory pension plan, 581.
—Educational activities lag (ed), 301.
—First aid graduates in Chicago, 541.
—Methods of training platform men, *698.
—Pension plans analyzed, 514.
—Pension plans should be on sound basis (ed), 499.
—Philadelphia rapid transit school [Summers], *132.
—Salesmen who wear overalls (ed), 179.
—School for linemen in Cleveland [Scott], *586.
—Selling an idea to the foreman [George], 519.

Erie, Pa.:
—Erie Railways:
New storage garage, *310.

F

Fare Decreases:
—Boston Elevated Railway:
Five-cent fare restored, 597.
—Cleveland's two-cent fare zone (ed), 557.
—Higher revenue with lower fares, 739.
—New Jersey:
Five-cent fare to be restored, 717.

Fare Increases:
—Baltimore, Md.:
Supreme Court decision, 75 (ed), 65.
—Boston, Mass.:
Boston, Revere Beach & Lynn R.R. increase, 236.
—Buffalo, N. Y.:
Decision reserved in case, 170.
—Cleveland, O.:
Cleveland Ry. fare increases, 52.
—Detroit, Mich.:
Detroit Municipal Railway increase, 165.
Municipal operation not immune from economic law (ed), 127.

Digitized by Google

Fare increases (Continued):
—Kansas City:
Supreme Court refuses fare stay, 655.
—Los Angeles, Cal.:
Rehearing asked, 59.
—Omaha, Neb.:
Increase asked for, 344.

Fares and fare collection:
—Fares and costs in 1929 [Richey], 13.
—Higher revenues with lower fares, *739.
—Milwaukee, Wis.:
Christmas shopping pass, 777.
—New York City:
Multiple coin turnstile, 178.
—Portland, Ore.:
Northwest Public Service Co.—weekly pass, 717.
—Richey fare index revised, 756.
—St. Louis Public Service Co.:
Results of first year of ticket plan, 655.
Tags transfer passengers, 752.

Financial:
—Baltimore, Md.:
United Railways & Electric Co.—Financial report, 658.
—Canadian Electric Railway Assn.:
Report on Canadian properties, 630.
—Capital structures of public utilities [Forbes], 473.
—Chicago, Ill.:
Chicago Rapid Transit—temporary financing proposed, 600.
Chicago, South Bend & Northern Indiana Railway, Financial Situation (ed), 127.
Improvement bonds for "L" approved, 658.
—Condensed reports of electric railway properties, 1928-1929, 204.
—Determining utility depreciation [Burke], 637.
—Electric railway properties, financial reports, 1929-1928, 308.
—Equipment trust certificates offered, 774.
—Georgia Power Co.:
Net revenue increased 400% in five years, *673.
—Investment by compulsion (ed), 612.
—Monthly reports, Jan. 50, Feb. 97, Mar. 158, Apr. 229, May 277, June 335, July 485, Aug. 539, Sept. 595, Oct. 643, Nov. 714, Dec. 760.
—New York City:
Begins to realize on its rapid transit investment, 603.
Third Avenue Ry.—co-ordinated bus operation increases revenues, *690.
—Oakland, Cal.:
Key System on new basis, 557.
—Operating statistics for 1929 [Murphy], 318.
—Portland, Ore.:
Pacific Northwest Public Service Co.—report, 289.
—Seattle, Wash.:
Municipal Railway troubles, 597.
—Small city properties appraise assets (ed), 245.
—Solving the problem for small-city systems (ed), 670.
—Statistics for 1929 [Buck], 41.
—Survey shows electric railways with full budget program [Miller], 182.
—Toledo, Ohio:
Unemployment hurts earnings, 488.
—Washington, D. C.:
New rates benefit railways, 657.
—Winnipeg Railway—financial report, 600.

Fort Wayne, Indiana:
—Fort Wayne-Lima Railroad:
Speeding up freight service, 288.

France:
—Paris:
Regenerative equipment planned for tramcars, *757.
Subway fusion takes effect, 115.
Subway system expands, 277.
—Paris-Lyon-Mediterranean railway gets heavy locomotives, 576.

Franchises:
—Akron, Ohio:
Temporary agreement extended 19 months, 345.
—Chicago, Ill.:
Transit settlement a message to the industry, 497.
Unification franchise almost ready, 288.
Unified transportation development, *500.
Voters approve unification franchise, 486.
—Jacksonville, Fla.:
Franchise rejected, 116.
—New York City:
Taxicab regulation recommended, *685.
—Rochester, N. Y.:
New York State Railways agree to new contract, 167.
—Springfield, Ohio:
Progress reported, 172.

Franchises (Continued):
—Toledo, Ohio:
Community Traction Co.—renewal of grant an issue, 486.

Freight and express:
—Allentown, Pa.:
Package service on Lehigh Valley Transit Co., 113.
—Attracting freight business [Pontius], *443.
—Dallas, Texas:
Texas Electric Railway—new locomotives facilitate freight handling, 260.
—Dayton, Ohio:
C. & L. E. R.R. receives new equipment, *298.
—Recent freight equipment assures a more profitable business [Thomas], *398.
—Speeding up service on Fort Wayne & Lima R.R., 288.

G

Garages:
—Erie Railways:
New garage built on unit plan, *310.
Georgia Power Co. (See Atlanta, Ga.)

Germany:
—Berlin:
Street cars washed by machine, *707.
Transportation facilities co-ordinated [Breslauer], *304.
—Dresden:
Articulated cars tested, *572.
—Elliptical steel tie, *654.
—Hamburger Hochbahn Aktiengesellschaft:
Interchangeable bearing repair [Feigenspan], *106.
Truck springs assembled by pneumatic machine [Korn], *339.
Warning signal insures proper meshing of gears [E. von Pirch], *588.

Grand Rapids, Mich.:
—Cars, buses, taxis and planes, 52.

Great Britain:
—Birmingham:
New light-weight cars, 719.
—Glasgow:
Financial report, 719.
—Liverpool:
No material changes recommended, 719.
—London:
Catches the car riding craze, 719.
Free shoe shines for subway passengers, *236.
London County Council Tramways get low-level cars, *687.
New suburban line, 547.
Subway construction approved, 547.
Subway tries roller bearings, *512.
"Tube" extensions to cost $65,000,000, 522.
Underground headquarters, highest commercial structure, *115.
Unified public control for transport services, 719.

H

Hammond, Ind.:
—Calumet Rys. formed, 56.
—Hammond, Whiting & E. Chicago Ry. sold, 56.

Hampton, Va.:
—Virginia Public Service Co.:
Ice cars advertise product, *632.
Slide valve grinder [Wood], *590.

Havana, Cuba:
—Causes of wheel failure studied [Gottschalk], *107.

Heavy electric traction:
—A.I.E.E. meeting considers railroad electrification, 682.
—D. L. & W. R.R.:
Scheduled speed increased by electrification, 683.
—Heating passenger trains on electrified steam railroads, 755.
—Maintaining distribution system N.Y.,N.H.&H. R.R. [Bardo], *507.
—Philadelphia facilities of P.R.R., *696.
—Power for Reading electrification [Doub], *747.
—Proceeding on merit (ed), 181.

Heavy electric traction (Continued):
—Reports on work at Amer. Elec. Railway Assn., 477.
—Serving the suburban commuter [Buck], *407.
—Statistics for 1929, 46.
—Suburban electrification [Wright] progress on Reading R.R., *212.
—Swiss scenic railroad electrified, *681.

I

Illinois Electric Railway Association:
—Annual convention, 235.

Indiana Railroad (See Anderson, Ind.)

Indianapolis, Ind.:
—Indianapolis & Martinsville Rapid Transit Co.:
Bondholders oppose receiver's certificates to meet expenses, 658.
—Indianapolis & Southeastern Railroad:
Important improvements in service, 235.
—Indianapolis Street Railway:
$9,000,000 choice (ed), 671.
Rerouting suggested under traffic survey, 600.
Security deposits satisfactory, 715.
—Interstate Public Service:
New mattresses for berths, 566.
—Terre Haute, Indianapolis & Eastern Traction Co.:
Indiana Commission rejects merger proposal, 291.
Merger—exception may prove rule (ed), 302.
Parlor-buffet service car, *208.

Insurance, Fire:
—Improved fire record brings lower insurance rate, (ed), 65.
—Lower rates in effect, 74.
—Neglect of precautions may prove costly (ed), 612.

International Tramway & Bus Association:
—Warsaw meeting, 523.

Iowa Electric Railway Assn.:
—October meeting, *773.

Italy:
—Length of electrified lines now 1,625 kilometers, 547.
—Rome:
Co-ordinated transit makes progress (ed), 126.
Readjusts car and bus routes [Ascarelli], *136.
To have modern subway, 115 [Vallecchi], *526.

J

Japan:
—Electric Railway makes scenic trips, 547.

K

Kansas City, Mo.:
—Kansas City Public Service Co.:
Insulating sleeve protects test points [Brindson], *224.
Spraying destination signs, *592.
—Traffic improvements planned, 623.

Knoxville, Tenn.:
—Knoxville Power & Light Co.:
Orders ten cars, 353, *727.
Trolley buses delivered, 244.
Trolley buses increase patronage, *735.

L

Legislation and legal matters:
—Atlanta, Ga.:
Supreme Court upholds lower court's decree, 345.
—Baltimore, Md.:
Supreme Court's rate decision, 75 (ed), 65.

Digitized by Google

Legislation and legal matters (Continued):
—Chicago, Ill.:
Fare case on Chicago "L" dragging, 230.
—Cleveland, Ohio:
Cleveland Railway wins partial victory for no zone cabs in Cleveland, 601.
Suburban rapid transit fare controversy, 600.
—Columbia, S. C.:
Supreme Court orders railway service to be resumed, 342.
—Determining utility depreciation [Burke], 567, 637.
—Interstate bus regulation advanced (ed), 180, 230.
—Louisville, Ky.:
Jurisdiction of court in fare case upheld, 233.
—Ohio:
Protest against competitive service sustained, 170.
—"Peoples Counsel" to protect or to harass? (ed) 246.
—Politics should not be permitted to seep into utility regulation (ed), 497.
—Use of one-man car upheld at Shreveport, 67.
—Interstate bus operation should be regulated (ed) 556.
—New York City:
No progress toward unification (ed), 246.
Unification bill introduced, 170.
—Providence, R. I.:
Regulates the taxi, 246.
—Interstate bus bill passed by house, 230.
—Washington, D. C.:
Progress reported on merger legislation, 167.

Lehigh Valley Transit Co. (See Allentown, Pa.)

Lethbridge, Alberta:
—Brady award won by municipal railway, *457.

Locomotives:
—Austrian locomotives featured by vertical motors, *511.
—Double-voltage operation features Midland Utilities locomotive [Perkinson], *524.
—Lackawanna Railroad gets switching locomotive, *726.
—New Haven orders ten locomotives, 667.
—Paris-Lyon-Mediterranean gets heavy locomotives, 576.
—Testing locomotives for Great Northern Railroad, *553.

Los Angeles, Cal.:
—Pacific Electric Railway:
Cleaning cars and equipment by sand blast, *762.
Long Beach repairs completed, 496.

Louisville, Ky.:
—Louisville Railway:
Accident prevention, 73.
Axle and armature bearing jig [Senior], *108.
Curtails its advertising, 661.
Statement to stockholders, 53.
Trolley wire break record, *48.

Lubrication (see Maintenance)
Economies in bus lubrication, *197.

M

Madison, Wis.:
—Madison Railways:
Demurs on paving, 345.

Maintenance, general:
Awards for first period, *159.
Awards for second period, *320.
Awards for third period, *645.
Bus Transportation awards, 220, 718.
New maintenance contest, 701.
—Efficient maintenance as a revenue producer, 303.
—Electric Railway Journal award won by Cleveland Railway, 644.
—Getting the most out of improvements (ed), 671.

Maintenance, general (Continued):
—Increased power department responsibility demands proper equipment and practices [Bale], *412.
—Materials and labor, 1927-1930, 10.
—Meeting the industry's equipment problem [Conway], 438.
—New contest, 701.
New Maintenance contest, 701.
—Putting maintenance on a production basis, 179.
—Snow removal practices and equipment, *678.
—Trends in material purchasing analyzed, 209.

Maintenance practices and devices:
—Buses and trucks:
Brake lining selected by test results [Stevens], *647.
Bus hood clamp locks easily [L. Rose], *588.
Bus wheels removed with a clamp [Hall], *763.
Clamp removes bus wheel, simple [Hall], *763.
Connecting rod boring tool [Rose], *646.
Deep crankcase pans, *103.
Double air chuck inflates dual tires [Grant], *160.
Exhaust gas fumes discharged from roof of bus, *587.
Feeler gages, simple [Stevens], *706.
Lighted brooms help clean [Stevens], *226.
Low jack for raising buses, *286.
Lubrication economies in Philadelphia *197.
Pump and heater facilitate transmission filling [Rose], *764.
Rack, portable, for special bus tools [Palmer], *531.
Stand facilitates bus motor adjustment [Stevens], *248.
Towing and spacer bar for disabled buses, *647.
Warning signal insures proper meshing of gears [von Pirch], *588.
Washing buses in record time [MacKay], *340.
Wheel aligner [Faircloth], *224.
Wheel nut wrench [Kehoe], *337.
Wrench for wheel nuts [Kehoe], *337.

—Car equipment:
Aluminum frame reduces railway motor weight, *576.
Ball bearing under brake handle [McAloney], *223.
Cars grounded on crown plate [Munford], *531.
Causes of wheel failure studied at Havana [Gottschalk], *107.
Circuit breakers tested in place [James], *108.
Cylinder boring device for air compressor [Sohl], *651.
Dash-illuminating headlight, *228.
Dolly for broken axles [Jonas], *160.
Dolly, demountable [Herms], *223.
Hand lever for testing bell ringers, *164.
Headlight, dash-illuminating, *228.
High voltage test discloses equipment weakness [Wms.], *226.
Hood rims and carlms reshaped [Davidson], *163.
Interchangeable bearings, repair of [Feigenspan], *106.
Jig speeds brake head drilling [Niederst], *651.
Loading plate with patterned surface, *228.
Lubricating car apparatus [Kauffman], 333.
Lubrication prolongs life of control equipment [Moses], *199.
Preventing loose breaker tips [McGinnis], *285.
Rachet jack, *286.
Radio interference eliminated by choke coil [Warner], *764.
Remodeling cars for one-man operation, *765.
Repairing 900 cars a year in the Boston Elevated shop, *330.
Reverser protectors prevent tampering [Hall], *224.
Rolling stock rehabilitation at Baltimore [Locke & Clark], *248.
Seating capacity increased in Winnipeg, *708.
Slide valve grinder [Wood], *590.
Supply car for B.-M.T. system, *227.
Sweeper broom blocks filled by machine [Scullin], *706.
Thermostat for close heat control, 770.
Tilting bench for controller repairs [Jonas], *283.

Maintenance practices and devices:
—Car equipment (Continued):
Tread flooring, *770.
Trolley base—light-weight, *593.
Trolley wheel lubricated with composition washer, *652.
Wheel grinding economical [Freemen], *341.
Work car equipped to spread material along track, *765.
—Cleaning, Car and Bus:
Cars washed by machine in Berlin, *707.
Car washing machine used in Philadelphia, *704.
Car washing speed doubled, *322.
Sand blast cleaning saves time and money, *762.
Scaffold for car washing, adjustable [Sohl], *535.
Washing buses in record time [MacKay], *340.

—Electrical shop:
Adjustable hanger for switch contactors [Brown], *708.
Armature bearing, bi-metallic, *538.
Armature core bands anchored [Dean], *221.
Armature dipping tank [Traw], *161.
Armature nut wrench [McRae], *285.
Armature removal machine [Scullin], *648.
Bell ringer tester, *164.
Clamp for installing field coils [Dumke], *704.
Commutator sander, *255.
Compact field shunting switch, *769.
Compensating controller fingers adjusted and installed [Moses], *337.
Copper and mica dust collected on commutator slotter [Beadle], *707.
Dog holds armature pinion [Leary], *648.
Field coil tester, *163.
Field testing and taping, *163.
Gage to check alignment of commutators [Dean], *589.
Grease prevented from entering armature bearing [Osborn], *224.
Grease ring protects commutators in ball-bearing motors [Beadle], *590.
Holder for dipping armature [Traw], *161.
Holder, light-weight, for electric welding, *594.
Installing and adjusting controller fingers [Moses], *337.
Insulating paste for bolt heads [Lackey], 766.
Insulating sleeve protects test points [Brindson], *224.
Insulation tested with portable transformer [Taurman], *763.
Lamp cord used for controller testing [Munford], 706.
Lamp storage during car overhaul [Hall], *589.
Simple cradle for storing armatures, *588.
Terminal for brush-holder leads, *286.
Test for partially open circuit [Beadle], *536.
Test, high voltage discloses equipment weakness [Williams], *226.
Testing air governors [McGinnis], *766.
Testing of field coils [Hall], *534.
Two-faced compass determines motor field popularity [Dumke], *650.
Welder, large-capacity, *594.

—General:
Bearing metal, steel-backed, *712.
Budget for 1930, 8.
Efficient maintenance as a revenue producer (ed), 303.
Hand grinders, portable, *713.
Hand tool, portable electric, *538.
Inspection lamps, electrically heated [Reinker], *161.
Modern machinery for better maintenance [Jonas], *418.
Multi-tool, portable electric, *538.
Pressure regulator for oxy-acetylene apparatus, *652.
Production basis urged (ed), 179.
Safety arm for coal and sand bin lids [App.], *649.
Shop efficiency improved by unit replacement system, *200.
Shovel truck for bulk material, *654.
Steel plate safety shoes fitted to ladders [Scullin], *589.
Thawing frozen water and conduit pipes [Brown], 217.
Whistle post made by old rail [Hysan], *591.

Digitized by Google

Maintenance practices and devices (Continued):
—Line:
Blinker light protects linemen on night work [Reinker], *651.
Cable roller for stringing feeder wire, *537.
Catenary clip, *287.
Contact line renewal [Scott], *709.
Crossovers, temporary [Scott], *533.
Equipment for overhead line maintenance, *336.
Flashing danger lights on tower trucks [Brown], *282.
Hanger for switch contactors, adjustable [Brown], *708.
Increasing height of span wire poles, *222.
Loosening tight wires in conduit [R. S. McIntosh], *587.
Low records in trolley wire breaks in nine cities, *48.
Lubrication of overhead trolley wire, *284.
Maintenance of distribution system on New Haven [Bardo], *507.
Marathon ear reduces wheel and wire wear, *594.
Marking wood poles for identification, 591.
Poles lengthened by splicing, *531.
Poles, reinforcing corroded, *340.
Potential wires check electrolysis [Stewart], *338.
Preventing loose breaker tips [McGinnis], *285.
Records of trolley wire breaks, 48.
Signal bell on tower truck [Brown], *221.
Stringing trolley wire [Neild], *216.
Tower ladder, triangular, *537.
Use of dynamometer successful in stringing trolley wire [Scott], 281.
Warning lights on tower wagon [Scott], *339.

—Lubrication:
Center bearing lubrication [Williams], *285.
Gun used for electric track switch lubrication [Brown], *286.
Lubricating car apparatus [Kauffman], 333.
Pressure lubrication, door engine used for [Herms], *222.

—Machine shop:
Babbitting, correct [Dean], *532.
Bearing jig, axle and armature, *108.
Boring of motor axle bearing seats [Greer], *650.
Chuck spindle equipped with roller bearings, *228.
Connecting rod boring tool [Rose], *646.
Cylinder boring device for air compressor [Sohl], *651.
Feeler gages [Stevens], *706.
Filling sweeper broom blocks by machine [Scullin], *706.
Grinder, slide valve [Wood], *590.
Grinders, portable sand, *713.
Grinding of wheels [Freeman], *341.
Hammer operated by compressed air [Pirkle], *225.
Ingenious jig speeds brake head drilling [Niederst], *651.
Jig for drilling brake hangers [Scullin], *341.
Jig for turning axle and armature bearings [Senior], *108.
Modern machinery a sound investment [Jonas], *418.
Oversize bearing housings bored in jig [Niederst], *650.
Portable bench for finishing bearings [Feigenspan], *106.
Spraying destination signs at Kansas City, *592.
Testing air governors [McGinnis], *766.

—Motors:
Aluminum frame reduces railway motor weight, *576.
Anchoring armature core bands [Dean], *221.
Armature nut wrench [McRae], *285.
Bimetallic armature bearing, *538.
Boring of motor axle bearing sets [Greer], *650.
Commutator sander, adjustable, *255.
Convenient machine for armature removal [Scullin], *648.
Dog holds armature pinion [Leary], *649.
Field shunting gives cars new pep [Moses], *710.

Maintenance practices and devices:
—Motors (Continued):
Field shunting switch, compact, *769.
Gage to check alignment of commutators [Dean], *589.
Grease entrance into armature bearings prevented [Osborn], *224.
Grease ring protects commutator on ball bearing motors [Beadle], *590.
Insulating paste for bolt heads [Lackey], *766.
Oversized bearing housings bored in jig [Niederst], *650.
Proper fit of brushes reduces chatter [Warner], 164.
Selection of motor controls [Beers], 575.
Shunting motors to obtain greater speed [Beers], 535.
Terminal for brush holder leads, *286.
Two faced compass determines motor field polarity [Dumke], *650.

—Paint shop:
Protection against corrosion, 711.
Spray painting outfit, *110.
Spraying destination signs at Kansas City, *592.
Window guard painting machine [Scullin], *283.

—Track and way:
Built-up compromise joints [Bragg], *282.
Center control for temporary block signal [Brown], *648.
Combination tie plate for various rails [Yeats], *108; Correction, 163.
Compromise joint for rail [Bragg], *282.
Concrete mixer has belt conveyor for loading [Spenzer], *536.
Concrete track built with minimum interruption, Boston, *101.
Connecting rod for tongue switches [Spenzer], *162.
Detecting broken rails [Evans], *223.
Disconnecting locked tongues of electric track switches [Grant], *161.
Double-milling rail heads to prevent cupping at joints [George], *103.
Double-track branch off [Yeates], *339.
Drainage, center subdrainage system, *533.
Elliptical steel tie, *654.
Grade crossing for heavy vehicular traffic, *705.
Gun used for electric track switch lubrication [Brown], *286.
Heavy-duty circular saw for track work, *110.
Installing safety zone markers [Davis], 341.
Iron rod used as dam for weld metal [Habercam], *225.
Leveling bar facilitates joint alignment [Anthony], *591.
Long level, one man [Evans], *104.
Maco template for registering rail contours, *594.
Mate floor of switches redesigned [Davis], *534.
Old rail used as whistle post [Hysom], *591.
Pavement straight edge [Costello], *104.
Portable motor flow pulsator, *287.
Portable oxyacetylene apparatus [Copeland], *226.
Portable sand drier and mix reheater, *593.
Pulsator for track work under traffic, *712.
Rail bond of steel and copper, *537.
Rail joint, flexible, Providence, 107.
Rail preheater, *538.
Reclaimed crank case oil for curves and switches [Botto], 163.
Rerailing at Atlanta, economical [Berman], *767.
Sand for track stored by compressed air [Yeates], *590.
Single life vs. renewable track, *191, 271.
Spray equipment for weed killing [Pirkle], *104; Correction, 163.
Switch, raised toe tongue [Spenzer], *338.
Switch heater supplied with gas fuel, *652.
Switch tongues built up by welding [Picklesimer], *283.
Switches for portable crossovers repaired [Spenzer], *707.
Track construction methods [Dalgleish], *130.
Track without ties [Mall], *154.

Maintenance practices and devices:
—Track and way (Continued):
Treated ties safely handled [Evans], *649.
Welding and cutting equipment [Hayes], *162.
Work car spreads material along track, *765.
Work schedules permit speedy track reconstruction [George], *278.

—Trucks:
Demountable dolly used in San Diego [Herms], *223.
Dolly for broken axle [Jonas], *160.
Gage makes wheel mounting easy [Scullin], *708.
Increasing truck-jaw life [Mondoux], *592.
Lubrication of center bearing [Williams], *285.
Removing trucks from cars on hoists [Munford], *284.
Springs assembled by pneumatic machine [Korn], *339.

—Welding:
Holder for electric welding, lightweight, *594.
Larger capacity welder, *594.

Management:
—Favorable results of Des Moints rehabilitation, *736.
—Getting the most out of improvements (ed), 671.
—Research demanded (ed), 731.
—Research department of Pittsburgh Rys., *732.

Market conditions:
—Material prices, 124, 178, 244, 300, 354, 496, 554, 610, 668, 728.

Maryland Utilities Association:
—Operators discuss latest developments, 661.

Memphis, Tenn.:
—Memphis Street Railway:
Track construction experience, *191.
Wage scale renewed, 233.

Merchandising transportation:
—Popularizing interurban service [Pontius], *443.
—Cincinnati & Lake Erie R.R.:
New de luxe cars, *614.
—Cincinnati Street Railway:
"Save by riding street cars—see more shows," *657.
—Des Moines improves service, *736.
—El Paso Electric Co.:
Selling tickets from house to house, 233.
—Higher revenue with lower fares, *739.
—Service best means of winning confidence (ed), 729.
—Solving the problem for small-city systems (ed), 670.
—Virginia Electric & Power Co.:
Sales promotion work done by trainmen [Womack], 521.

Middle Atlantic States Equipment Men:
—Meets at Norfolk, 775.

Mid-West Electric Railway Association:
—Annual meeting, 717.

Milwaukee, Wis.:
—Milwaukee Electric Railway & Light Co.:
Buys ten two-car trains, 353.
Christmas Shopping Pass, 777.
Rate case under way, 423.

Minneapolis, Minn.:
—Twin City Rapid Transit Co.:
Snow removal practice, *676.

Missoula, Mont.:
—Honorable mention in Brady award won by Montana Power Co., *457.

Mobile, Ala.:
—Mobile Light & Railroad Co.:
Bids for patronage with clean cars, close headway and smooth track [Faust], *558.
New cars ordered, 354.

Digitized by Google

Modernization:
—Conditions favorable now for modernization (ed), 611.
—Consigning junk to junk pile (ed), 180.
—Serviceable but not suitable (ed), 245.

Monroe, La.:
—Municipal Street Ry. receives new cars, 494.

Montreal, Quebec:
—Montreal Tramways:
Installs third automatic rectifier substation [de Angelis], *577.
Rapid transit proposed, 771.
Snow removal practice, *676.
To help defray tunnel cost, 657.

Motor bus, design:
—Detroit D.S.R. bus equipped for roof discharge of exhaust fumes, *587.
—Diesel bus tested, 425.
—Dodge Bros. new models, *609.
—Fargo 8-cylinder bus, *653.
—Fitzjohn body designed for Ford chassis, *768.
—Improving the bus to increase its usefulness [Stocks], *387.
—Mack "Salon club car," *713.
—Pickwick double deck observation bus, *287.
—Twin Coach small-capacity bus, *711.
—White six-cylinder buses, *769.

Motor buses, general:
—Berlin transportation facilities co-ordinated [Breslauer], *304.
—"Bus Transportation" offers awards, 220.
—Buses bought by railways in 1929, 24.
—Bus route extensions, city and intercity in 1929, 26.
—Car, bus and taxicab services co-ordinated at New Bedford, 448.
—Co-ordination at Poughkeepsie, *252.
—De luxe buses become a necessity in cities (ed), 66.
—De luxe bus in interurban service [Stauffer], *144.
—Development of buses and trolley buses, 456.
—Electric railways win bus maintenance awards, 718.
—For mass transportation [Warner], *745.
—Interstate bus regulation advanced (ed), 180, 230.
—Interstate bus regulation needed (ed), 556.
—Merit alone should control substitution of buses for cars (ed) 498.
—New York City:
Third Avenue Ry.—co-ordinated bus operation increases revenues, *690.
—Operation by electric railways and subsidiary companies [Stauffer], 20.
—Paterson, N. J.:
Public Service Co-ordinated Transport—buses replace cars, *315.
—P.R.T. effects economies in bus lubrication, *197.
—Urban transportation facilities keep pace with population increase (ed), 669.

Motor buses, gas-electric:
—Development of the bus in mass transportation [Warner], *745.
—Electric governor for buses, *160.
—Single-motor drive for gas-electric buses [Atwell], 164.

Motors:
—Commercial frequency for single-phase road, 510.
—Compound equipment in Paris, *757.
—Economics of high-speed motor and drive [Bethel], 465.
—Field shunting advantageous [Moses], *710.
—More power needed [Welsh], 750.

N

National Electric Light Association:
—Heating passenger trains on electrified steam railroads, 755.

Newark, N. J.:
—Public Service Co-ordinated Transport:
Acquires Yellow Cab control, 171.
Buses replace cars in Paterson, *315.
Five-cent fare to be restored, 717.
New bus terminal in New York, *251.
Operations analyzed, 56.
Place of the bus in mass transportation [Warner], *745.
Places largest bus order, 178.

New Bedford, Mass.:
—Union Street Railway:
Abstract of Coffin Contest brief, 448.

New Haven, Conn.:
—Connecticut Co.:
Increasing height of span wire poles, *222.
Marking wood poles for identification, *591.
Track construction experience, 191.
—New York, New Haven & Hartford R.R.
Maintaining the distribution system of an electrified railroad [Bardo], *507.
Ten new locomotives ordered, 667.

New Orleans, La.:
—New Orleans Public Service, Inc.:
Shop efficiency improved by unit replacement system, *200.
Track without ties [Mall], *154.
Trolley buses installed on shuttle line [Rainville], *141.
Trolley wire break record, *48.

New York City:
—Passengers carried in 1929, 51.
—Brooklyn-Manhattan Transit Co.:
Socony lubricants for company, 178.
Supply car for system, *227.
—Brooklyn & Queens Transit Corp.:
Eighteen lines to be rerouted, 236.
New cars in service, *242.
Track construction experience, *191.
Trolley bus service started, 553.
Want trolley buses, 426.
—Bus substitution should depend on merit, (ed), 498.
—Eighth Avenue Subway:
Nearing completion, 601.
New subway cars for new line, 488.
—Elevated railways value proved anew (ed), 66.
—Interborough Rapid Transit:
City begins to realize on its investment, 603.
—Long Island R.R.:
Orders 85 new steel cars, 494.
Receives steel cars, 785.
—New York Bd. of Transportation:
Large order for heaters, 178.
—New York & Queens County Railway:
Bonus plan works well, 513.
—Public Service Co-ordinated Transport:
New terminal, *251.
—Richmond Railways:
Cradle for storing armatures, *588.
Testing pneumatic bell ringers, *164.
—Subway cars being delivered, 608.
—Taxicabs:
Regulation as a public utility recommended, *685.
—Third Avenue Ry.:
Bus receipts, 113.
Co-ordinated bus operation increases revenues, *690.
Long poles made by splicing, *531.
Rearranging parked area on Broadway, 116.
Reinforcing corroded poles, *340.
—Yonkers Railroad, Westchester Electric Railroad and New York, Westchester & Connecticut Traction Co. seek fare increases, 544.

Niagara Falls, N. Y.:
—International Railway:
Settlement of case to be arranged, 543.
Fare increase sustained, 775.

Noise Reduction:
—Elimination in rapid transit studied, 546.
—Lowering costs and bettering public relations by reducing noise [Williams], *376.
—Putting noise on the defensive (ed), 67.

Norfolk, Va.:
—Virginia Electric & Power Co.:
Bus wheels removed with a simple clamp [Hall], *763.
Field coil testing [Hall], *534.
Sales promotion work by trainmen [Womack], 521.
Storage of lamps during car overhaul [Hall], *589.

O

Oakland, Cal:
—Key System on new financial basis (ed), 557.

Ohio Edison Co. (See Akron, Ohio)

Oklahoma City, Okla.:
—Oklahoma Railway:
Description of new cars, 699.

Omaha, Neb.:
—Omaha & Council Bluffs Street Railway:
Citizens to vote on bridge bond issue, 658.
Fare increase asked, 344.
New rerouting, 236.
Rerouting plan in Omaha changed, 169.

Operating records and costs:
—Baltimore, Md.:
United Railways & Electric Co.—analysis of car performance during rush hours, 249.
—Beware of costly economies (ed), 555.
—Cincinnati & Erie R.R.:
Car earnings, sales of tickets and rates, 620.
—Cost analyses indicate field of the trolley bus [Clardy], 622.
—Eastern Texas Electric Co.:
Gross and net increased by company, 453.
—Georgia Power Co.:
Revenues and expenses 1925-1929, *673.
—Higher revenue with lower fares, 739.
—Industry in more favorable position, 3.
—Lowering costs and bettering public relations by reducing noise [Williams], *376.
—New Orleans Public Service, Inc.:
Shop efficiency improved by unit replacement system, *200.
—New York City:
Third Ave. Ry.—statistics, *692.
—Operating statistics for 1929 [Murphy], 318.
—Survey of materials and supplies in stock, 181.
—Toledo, Ohio:
Community Traction Co.—services modernized and co-ordinated, 452.
—Trends in material purchasing analyzed, 209.

Ottawa, Ontario:
—Ottawa Electric Railway:
Cars grounded on crown plate [Munford], *531.
Honorable mention in Brady Award, *457.
Increasing truck-jaw life [Blondoux], *592.
Insulating paste for bolt heads [Lackey], 766.
Lamp cord used for controller testing [Munford], 706.
Removing car trucks [Munford], *284.
Testing circuit breakers [James], *108.

Overhead contact system:
—Are essential in stringing trolley wire [Neild], *216.
—Catenary clip, *287.
—Dynamometer for stringing trolley wire [Scott], *281.
—Overhead for temporary crossovers [Scott], *533.
—Renewal of [Scott], 709.
—Trolley car improved, *594.
—Trolley bus requirements [Bowen], *693.

P

Pacific Electric Railway (See Los Angeles, Cal.):

Pacific Northwest Public Service Co. (see Portland, Ore.)

Parking of automobiles:
—Detroit, Mich.:
D.S.R. parking service popular, 582.
—Kansas City traffic improvements planned, 623.
—Washington, D. C.:
Garage problem and parking studied, 659.

Patents:
—Carey Elastite patent sustained, 727.

Paterson, N. J.:
—Public Service Co-ordinated Transport:
Buses replace cars, *315.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

Digitized by Google

Pavements:
—Road builders recommend relief of paving obligations, 143.
—Safety zone markers, installing [Davis], 341. Steel markers at Washington, D. C., 742.

Pennsylvania Railroad:
—(See Philadelphia, Pa.):

Pensions (See Employees)

Philadelphia:
—Engineers report on transit, 422.
—Pennsylvania Railroad:
Opens new facilities in Philadelphia, *696.
Separation of suburban from through traffic, 425.
—Philadelphia Rapid Transit Co.:
Car washing machines, *704.
Checking up and appraisal of physical assets ordered, 602.
Economy in bus lubrication, *197.
Late T. E. Mitten large share holder, 661.
Purchase by city discussed, 661.
Sample car of new type, *741.
School for rapid transit employees [Summers], *132.
Transit tangle, 111.
—Philadelphia & Western Railway:
Conway interests take railway, 423.
—Reading Co.:
Electrification proceeding, 667.
Reliability features power supply [Doub], *747.
Suburban electrification making rapid progress [Wright], *212.

Pittsburgh, Pa.:
—Allegheny Valley Street Railway:
Comfort and speed on new cars [Inglis], *242.
Complete car replacement on Allegheny Valley route, *150.
—Pittsburgh Railways:
Research department aids railway operations, *732, (ed), 731.
Statistics on securities amplified [Mitchell], 153.
—Progressive signals aid traffic movement [Stauffer and Marsh], *261.
—Terminal planned at Uniontown, Pa., 168.
—Traffic signal controlled by car movement, *752.
—West Penn Railways:
Reverser protector [Hall], *224.
Snow removal practice, *676.

Portland, Ore.:
—City Planning Commission:
Consideration of service-at-cost grant postponed, 658.
—Pacific Northwest Public Service Co.:
Segregation move, 600.
Statement, 289.
To form two subsidiaries for administrative purposes, 541.
Wage proposal rejected, 234.
Weekly pass, 717.

Poughkeepsie, N. Y.:
—Poughkeepsie & Wappingers Falls Railway:
Income increased by co-ordination, *252.

Power, general:
—More power [Welsh], 750.
—Increased power department responsibility demands proper equipment and practices [Bale], *412.
—Cleveland Union Terminal Co.:
Motor generators supply power for terminal electrification [McDonald], *633.
—Reading Co.:
Reliability features power supply [Doub], *747.

Power Distribution:
—Cable roller for stringing feeder, *537.
—Reading Company System [Doub], *747.
—Steel and copper rail bond, 537

Providence, R. I.:
—United Electric Railways:
Flexible rail joint tried, 107.
Snow removal practice, *676.
Window wipers for cars, 170.

Public relations:
—Higher revenue with lower fares, 739.
—Improvement in the ride is the most effective stimulant of public interest [Gordon], 360.
—Lowering costs and bettering public relations by reducing noise [Williams], *376.
—Mobile Light & Railroad Co.:
Bids for patronage with clean cars, close headway and smooth track [Faust], *558.
—Speed an essential of street car performance [Rossell], *368.

Puget Sound Power & Light Co. (See Seattle, Wash.)

R

Rapid transit:
—Attaining faster schedules [Clardy], *257.
—Data on lines in U. S., 19.
—Growing need for rapid transit [Dana], *391.
—Paris, France:
Subway system expands, 277.
—Philadelphia, Pa.:
Instruction for trainmen [Summers], *133.
—Proposed for Montreal, 771.
—Rome to have modern subway [Vallecchi], *526.

Reading, Pa.:
—Reading Transit Co.:
Radio interference from cars eliminated by choke coil [Warner], *764.

Rectifiers:
—Mercury arc rectifiers meet transportation demands [Baker], *311.
—Montreal Tramways installs rectifier substations [de Angelis], *577.

Richmond, Va.:
—Virginia Electric & Power Co.:
Bus wheel aligner [Faircloth], *224.

Roanoke, Va.:
—Roanoke Railway & Electric Co.:
Circulating sales manager, 233.

Rochester, N. Y.:
—New York State Railways:
Ancillary receivers appointed, 113.
Decree of foreclosure ordered, 233.
Receivers appointed, 58, 113.
Track construction experience, *191.
Wage scale renewed, 234.
—Rochester-Buffalo Coach Lines:
Bus order modified, 541.
—Rochester, Niagara Falls & Buffalo Coach Lines:
Buses to replace railway service, 425.

S

Safety (See Accident prevention)

St. Louis, Mo.:
—People's Motor Bus Co.:
Terms of settlement of bus strike, 291.
—St. Louis Public Service Co.:
Remodeling cars for one-man operation, *765.
Report on expenditures, 55.
Results of first year of ticket plan, 655.
Sample car, *105.
Tags transfer passengers, 752.
To reopen wage agreement, 289.
—Transportation Survey Commission:
Co-ordination of transit facilities proposed, 743.
Program for improvement should be acted upon (ed), 556.
Report to Board of Aldermen, 540.

Salt Lake City, Utah:
—Combination traffic and warning signal, *571.
—Salt Lake & Utah Railroad:
Rails, detecting breaks [Evans], *223.
Reorganization to be speeded, 345.

San Antonio, Texas:
—San Antonio Public Service Co.
Reclaimed oil used for curves [Botto], 163.

San Diego, Cal.:
—San Diego Electric Railway:
Demountable dolly [Herms], *223.
Pressure lubrication [Herms], *222.
Question of jurisdiction in hearing, 545.

San Francisco, Cal.:
—Market Street Ry.:
Speeding up service [Kahn], *442.
Track construction experience, *191.
—Municipal Railway:
Paving charges [Boeken], 99.
Track construction experience, *191.
—Northwestern Pacific Railroad:
Orders new rolling stock, 494.
—Southern Pacific Co.:
Center drainage system reduces track maintenance cost, *533.

Schenectady, N. Y.:
—Schenectady Railway:
Commission authorizes buses on two lines, 425.

Schools:
—Cleveland Railway:
Instruction school for linemen [Scott], *586.
Methods of training platform men, 698.
Selling an idea to the foreman [George], 519.
—Educational activities lag (ed), 301.
—P.R.T. gives instruction for trainmen [Summers], *132.

Seattle, Wash.:
—Problems of city ownership (ed), 613.
—Puget Sound Power & Light Co.:
Sale ordered, 289.
—Seattle Municipal Railway:
In insolvent condition (ed), 730.
Two-year moratorium, 55.
Taxi cuts revenue, 345.

Shreveport, La.:
—Shreveport Railways:
One-man case won, 117 (ed), 67.

Signals (See also Traffic regulations):
—Highway crossing signals with mechanical contactors, *768.
—Railway crossing signals should be distinctive [Nachod], 99.
—Traffic signals controlled by street cars, *752.
—Two-color or three-color signals [Ross], 98.

Snow and ice removal:
—Buffalo, N. Y.:
International Railways adopts new methods, *231.
—Survey of methods used on numerous properties, *676.

Society of Automotive Engineers:
—National Transport Meeting program, 541.

South Bend, Ind.:
—Northern Indiana Railway:
Financial situation (ed), 127.
New cars ordered, 298.
New company formed, 168.

Springfield, Mass.:
—Springfield Street Ry.:
Snow removal practice, *676.

Standardization:
—A.I.E.E. to revise standards for control apparatus, 562.
—Simplification of materials and supplies [Cooper], 323.

Stark Electric Railway (See Alliance, Ohio)

Staten Island, N. Y. (See New York City):

Statistics:
—Accelerated progress forecast (ed), 1.
—Annual figures encouraging (ed), 301.
—Bus operation by electric railways and subsidiary companies [Stauffer], 20.

Digitized by Google

Statistics (Continued):
—Canadian Electric Railway Assn.: Report on industry, 630.
—City and interurban electric railways and electrified steam lines, 6.
—Condensed financial reports of electric railway properties 1929-1928 [Tables], 204.
—Construction work in heavy electric traction in 1929, 46.
—Costs and fares in 1929 [Richey], 13.
—Electric railways doing well compared to other industries (ed), 555.
—Electric railway properties, financial reports 1929-1928, 308.
—Expenditures for materials and plant [Faust], 8.
—Financial situation in 1929 [Buck], 41.
—Industry in more favorable position, 3.
—Operating statistics for 1929 [Murphy], 318.
—Railways proceeding with full budget program [Miller] 82, (ed) 179.
—Rapid transit lines in U. S., 19.
—Richey fare index revised, 756.
—Rolling stock ordered during 1929 [van der Stempel], 33.
—Track extensions, reconstruction and abandonments in 1929 [Miller], 15.
—Trends in material purchasing analyzed (ed), 181, *209.
—Trolley bus operation in U. S. and Canada, 37.
—Urban transportation facilities in 1930 (ed), 669.

Stores:
—Elimination of waste [Duncan], 467.
—Relations of purchasing and engineering [Harris], 464.
—Simplification of materials and supplies [Cooper], 323.
—Trends in material purchasing analyzed, 209.

Street traffic congestion:
—Kansas City traffic improvements planned, 623.
—Preferential traffic rights for street cars [Daniels], 218, (ed), 181.
—St. Louis:
Auto does not justify its use in streets, 422.

Substations and equipment:
—Baltimore station wins architectural distinction, *131.
—Cleveland Union Terminals Co.:
Motor generators supply power for terminal electrification [McDonald], *633.
—Increased power department responsibility demands proper equipment and practices [Bale], *412.
—Montreal Tramways:
Installs third automatic rectifier substation [de Angelis], *577
—Reading Co.:
Reliability features power supply [Doub], *747.

Switzerland:
—476 miles to be electrified, 115.
—Scenic railway electrified, *681.

T

Tampa, Fla.:
—Tampa Electric Co.:
Accident prevention, *71.

Taxation:
—Road builders recommend relief of paving obligations, 143.
—Utility taxation [Lack], 442.

Taxicab:
—As a public utility (ed), 670.
—City transit problems better understood (ed), 498.

Taxicab (Continued):
—Control of 400 cabs acquired by Pub. Serv. Co-ord. Transport, 171.
—Defining the place (ed), 125.
—Rate war in Springfield, Mass., 346.
—Regulation in Providence, R. I. (ed), 246.
—Regulation as a public utility recommended in N. Y., *685.
—Undermining an essential service (ed), 731.

Toledo, Ohio:
—Community Traction Company:
Abstract of Coffin Contest brief, 452.
Displays its wares, 601.
Revamping of Milner ordinance, 655.
Unemployment hurts earnings, 488.
—Toledo, Bowling Green & Southern:
Granted authority to suspend, 659.
—Toledo, Fostoria & Findlay:
Granted authority to suspend, 659.

Toronto, Ont.:
—Toronto Transportation Commission:
Armature nut wrench [McRae], *285.
Care essential in stringing trolley wire, [Neild], *216.
Disconnecting switch tongues [Grant], *161.
Snow removal practice, *676.
Trolley wire break record, *48.

Track construction:
—Boston Elevated Ry.:
Building concrete track with minimum interruption of service, *101.
—Building better track [Wysor], *403.
—Cleveland Railway:
Accurate work schedules permit speedy track reconstruction [George], *278.
One-man long level [Evans], *104.
Straight edge for pavement [Costello] *104.
—Extensions, reconstruction and abandonments in 1929 [Miller], 15.
—Georgia Power Co.:
Economical rerailing [Berman], *766.
Good layouts facilitate routing, *672.
Mortar flow pulsator, *287.
—New Orleans Public Service, Inc.:
Track without ties [Mall], *154.
—Pulsator for work under traffic, *712.
—Rail preheater, *538.
—Ratchet jack, *286.
—Sand drier portable, *593.
—San Francisco Municipal Ry.:
Extensive paving [Boeken], 99.
—Selling an idea to foremen [George], *519.
—Single life versus renewable track, *191, 271.
—Special work built in place [Yeates], *339.
—Statistics for 1929, 16.
—Track in paving:
—Washington, D. C.:
Ties imbedded in pre-mixed concrete [Dalgleish], *130.

Trackless trolley (See Trolley bus)

Traffic regulation:
—Compulsion or persuasion of pedestrians (ed), 301.
—Correct timing of signals essential in traffic regulation [Matson], 82.
—Kansas City:
Improvements planned, 623.
—New York City:
New pedestrian control, 344.
Taxicab regulation recommended, *685.
—Preferential traffic rights for street cars [Daniels], 218, ed) 181.
—Progressive signal system aids movement in Pittsburgh [Stauffer and Marsh], *261.
—Short signal cycles speed traffic and reduce accidents [Bibbins], 631.
—Signals:
Combination traffic and warning signal used at Salt Lake City, *571.
Two color vs. three color [Ross], 98.
—Street markers in Washington, D. C., 742.
—Survey in Washington, 344.

Track Regulation (Continued):
—Traffic officers as transportation men [Taylor], 128.
—Trolleys speeded by new stagger system, 544.

Trailer:
—Chicago Surface Lines:
Suspends trailer operation, *640.
—Dropping the trailer (ed), 613.

Transportation, general:
—Growing need for public transportation (ed), 247.
—Making faster car operation practicable (ed), 730.
—1930's challenge to transportation [Shoup], 431.
—Piling up bricks and trouble (ed), 303.
—Serviceable but not suitable (ed), 245.
—Serving the suburban commuter [Buck], *407.
—Speed increased through detailed analysis, 499.
—Too many self-appointed experts (ed), 302.
—Transportation men are community builders. [Curtiss], 440.

Transportation, metropolitan:
—Berlin, Germany, transportation facilities co-ordinated [Breslauer], *304.
—Chicago, Ill.:
Unified transportation development, *500.
—City transit problems are becoming better understood (ed), 498.
—Co-ordinated transit makes progress (ed), 126.
—Cut-rate taxi a menace (ed), 731.
—Development of bus for mass transportation [Warner], *745.
—Merchants—hitting them in the pocketbook. (ed), 557.
—Modern vehicles and equipment for urban transportation [Burleson], 466.
—Place of the bus in mass transportation [Warner], *745.
—Public transportation gaining steadily in large cities (ed), 125.
—Rome readjusts car and bus routes [Ascarelli], *136.
—St. Louis, Mo.:
Co-ordination of transit facilities proposed, 743.
—Solving the problem for small-city systems (ed), 670.
—Survey of Baltimore to show shifts of business, 310.
—Surveys often valueless (ed), 671.
—Taxicabs as a public utility (ed), 670.
population (ed), 669.
—Urban transportation facilities keep pace with

Trolley Bus:
—Brooklyn & Queens Transit Corp.:
Asks permission to use trolley buses, 426.
Inaugurates trolley bus service, 553.
—Chicago Surface Lines:
Brill delivers vehicles, *784.
Largest trolley bus system, *272.
More vehicles ordered, 426.
Operating statistics prove success of trolley buses in Chicago [Forty], *563.
Orders placed, 244.
Steel poles used for trolley bus system, *317.
—Cost analyses indicate field of the trolley bus [Clardy], 622.
—Detroit Dept. of Street Raliways:
Operation proves advantageous, *753.
Plans for inauguration, 425.
Proposed for use, 165.
—Improved trolley bus [Richardson], *371.
—Knoxville Power & Light Co.:
Increase patronage, *735.
Vehicles delivered, 244.
—Naming the new baby (ed), 729.
—New Orleans Public Service Co.:
Installs on shuttle line [Rainville], *141.
Tax and license rulings, 232.
—Operations in U. S. and Canada, 37.
—Rockford Electric Co.:
System to be operating soon, 715.
—Successful operation demands suitable overhead [Bower], *693.
—Utah Light & Traction Co.:
To be used on Capital St., 598.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. *c* Communications.

Digitized by Google

U

Union Internationale de Tramways, etc. (See International Tramway & Bus Assn.)

United Railways & Electric Co. (See Baltimore, Md.)

Union Street Railway (See New Bedford, Mass.)

V

Vancouver, British Columbia:

—British Columbia Electric Ry.:
Details of new cars, 63, *123.

Virginia Electric & Power Co. (See Richmond and Norfolk, Va.):

Virginia Public Service Co. (See Hampton, Va.)

W

Washington, D. C.:

—Capital Traction Co.:
Surrounding men with conveniences [McCarty], *583.

Washington, D. C.:
—Capital Traction Co. (Continued):
Ties imbedded in premixed concrete [Dalgleish], *130.

Track construction methods [Dalgleish], *130.

—Experiments with new markers, 742.

—Washington Railway & Electric Co.:
New rates benefit railways, 657.

Waste (See Stores)

West Penn Rys. (See Pittsburgh, Pa.)

Westinghouse, George:

Memorial dedicated, *660, 689.

Wilmington, Del.:

—Standard Steel Car Co. & Osgood Bradley Car to merge with Pullman Co., 63.

Wilmington, N. C.

—Tide Water Power Co.:
Accident prevention, 72.

Windsor, Ontario:

—Hydro Elec. Pwr. Comm. orders new cars, 63.

—Receives new cars, 496.

Windsor, Ontario (Continued):
—Windsor, Essex & Lake Shore Railway:
Modern design in new cars, *565.

Winnipeg, Manitoba:

—Winnipeg Electric Co.:
Electrolysis checked [Stewart], *338.
Financial report, 600.
Seating capacity of cars increased, *708.
Snow removal practice, *676.
Track improvements, 64.

Y

Yakima, Washington:

—Yakima Valley Transportation Co.:
New cars, *299.

York, Pa.:

—York Railways:
Receives three new cars, *785.

Youngstown, Ohio:

—Youngstown Municipal Railway:
Speedy, light-weight cars [Graham], *267.
Wins Coffin award, *446.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

Digitized by Google

AUTHOR INDEX

A

Anthony, William:
—Leveling bar facilitates joint alignment, *591.
App, Joseph:
—Safety arm for coal and sand bin lids, *649.
Ascarelli, Mario:
—Rome readjusts car and bus routes, *136.
Atwell, C. A.:
—Advantages of single-motor drive for gas-electric buses, 164.

B

Baker, C. E.:
—Mercury arc rectifiers meet transportation demands, *311.
Bale, L. D.:
—Increased power department responsibility demands proper equipment and practices, *412.
Bardo, B. F.:
—Maintaining the distribution system of an electrified railroad, *507.
Beadle, H. J.:
—Copper and mica dust collected on commutator slotter, *707.
—Grease ring protects commutators on ball-bearing motors, *590.
—Test for partially open circuit, *536.
Beers, R. S.:
—New Albany car includes many innovations, *78.
—Selection of motor controls depends on circumstances, 575.
—Shunting motors to obtain greater speed, 535.
Berman, D. S.:
—Economical rerailing at Atlanta, *766.
Bethel, C.:
—Economies of high-speed motor and drive, *465.
Bibbins, J. Rowland:
—Short signal cycles speed traffic and reduce accidents, *631
Boeken, F.:
—Extensive paving work done by San Francisco municipal railway, 99.
Botto, Louis T.:
—Reclaimed crank case oil for curves and switches, 163.
Bower, G. W.:
—Successful trolley bus operation demands suitable overhead, *693.
Bragg, H.:
—Built-up compromise joint, *282.
Breslauer, Walter:
—Berlin transportation facilities co-ordinated, *304.
Brindson, T. E.:
—Insulating sleeve protects test points, *224.
Brown, H. A.:
—Adjustable hanger for switch contactors, *708.
—Center control for temporary block signal, *648.
—Flashing danger lights on tower trucks, *282.
—Gun used for electric track switch lubrication, *286.
—Signal bell on tower truck, *221.
—Thawing frozen water and conduit pipes, 217.
Brown, L. M.:
—The dodo became extinct because it ceased developing, 90.
Buck, Morris:
—Great improvement in financial situation, *41.
—Serving the suburban commuter, *407.
Burke, John W.:
—Determining utility depreciation on a logical basis, 637.
—Utility valuation demands logical treatment, 567.
Burleson, C. A.:
—Modern vehicles and equipment for urban transportation, *466.
Butler, F. L.:
—Safety devices aid materially in reducing accidents, *383.

C

Clardy, W. J.:
—Attaining faster schedules in rapid transit service, *257.
—Cost analyses indicated field of the trolley bus, 622.
Clark, A. T. and Dean J. Locke:
—Extensive rolling stock rehabilitation at Baltimore, *248.
Conway, Thomas, Jr.:
—Meeting the industry's equipment problem, *438.
Cooper, George A.:
—Underground overhead, *323.
Copeland, A. B.:
—Portable oxyacetylene apparatus, *226.
Costello, P. H.:
—Pavement straight edge, *104.
Curtiss, John E.:
—Transportation men are community builders, *440.

D

Dalgleish, R. H.:
—New track construction methods prove speedy and economical, *130.
Dana, Edward:
—Answering a growing need for adequate rapid transit, *391.
Daniels, Winthrop M.:
—Preferential traffic rights for street cars, *218.
Davidson, James:
—Hood rims and carlins reshaped by machine, *163.
Davis, H. A.:
—Air-magnetic brakes make quick stops, *256.
Davis, W. P.:
—Installing safety zone markers, 341.
—Redesigned mate floor prevents derailments, *534.
Dean, J. S.:
—Anchoring armature core bands, *221.
—Gage to check alignment of commutators, *589.
—Tests show importance of correct babbitting, *532.
de Angelis, M. L.:
—Montreal Tramways installs third automatic rectifier substation, *577.
De Forest, A. T.:
—Engineering influence in Western developments, 463.
Doub, C. L.:
—Reliability features Reading's power supply, *747.
Dumke, R.:
—Clamp for installing field coils, *704.
—Two-faced compass determines motor field polarity, *650.
Duncan, A. S.:
—Elimination of waste, *467.

E

Evans, Carl W.:
—Detecting broken rails, *223.
Evans, R. B.:
—One-man long level, *104.
—Treated ties safely handled, *649.

F

Faircloth, W. R.:
—Bus wheel aligner, *224.
Faust, Clifford A.:
—Aluminum gaining in favor for car construction, *184.
—Detroit express service gains popularity, *85.
—Expenditures for improvements mount upward, 8.
—Mobile bids for patronage with clean cars, close headway and smooth track, *558.
Feignespan, Max:
—Repair of interchangeable bearings, *106.
Forbes, John F.:
—Capital structures of public utilities, 473.
Forty, F. A.:
—Operating statistics prove success of trolley buses in Chicago, *563.
Freeman, J. B.:
—Grinding of wheels makes maintenance economical, *341.

G

George, Howard H.:
—Accurate work schedules permit speedy track reconstruction, *278.
—Double-milling rail heads to prevent cupping at joints, *103.
—Selling an idea to the foreman, *519.
Giltner, J. W.:
—Blind accidents and how to handle them, 470.
Gordon, Charles:
—Co-operative effort is essential, *437.
—Improvement in the ride is the most effective stimulant of public interest, *360.
Gottschalk, Otto:
—Causes of wheel failure studied at Havana, *107.
Graham, R. N.:
—Obtaining an attractive appearance with simplicity and utility in design, *363.
—Speedy, light-weight cars placed in service in Youngstown, *267.
Grant, G. I.:
—Disconnecting locked tongues of electric track switches, *161.
Grant, Richard:
—Double air chuck inflates dual tires evenly, *160.
Greer, John:
—Simplified boring of motor axle bearing seats, *650.

H

Habercam, F. B.:
—Iron rod acts as dam for weld metal, *225.
Hall, Benjamin H.:
—Reverser protectors prevent tampering, *224.
Hall, C. B.:
—Bus wheels removed with a simple clamp, *763.
—Storage of lamps during car overhaul, *589.
—Testing of field coils, *534.
Hanna, J. H.:
—Co-operative effort is greatest need, *357.
Harris, Frank M.:
—Relations of purchasing and engineering, *464.
Hayes, W. H.:
—Welding and cutting equipment combined, *162.
Hellmuth, G. T.:
—Painstaking investigation reduces fraudulent claims, *469.
Herms, Charles:
—Demountable dolly used in San Diego, *223.
—Door engine used for pressure lubrication, *222.
Hysan, Joseph M.:
—Old rail makes satisfactory whistle post, *591.

I

Inglis, J. G.:
—Comfort and speed on new Allegheny Valley cars, *242.

J

James, R. W.:
—Testing circuit breakers in place, *108.
Jonas, E. J.:
—Emergency dolly for broken axles, *160.
—Modern machinery for better maintenance, *418.
—Tilting bench for controller repairs, *283.

K

Kahn, Samuel:
—Speeding up service, *442.
Kauffman, H. L.:
—Lubricating car apparatus, 333.
Kehoe, Jack:
—Wrench for wheel nuts, *337.
Korn, Hans:
—Truck springs assembled by pneumatic machine, *339.

L

Lack, M. D.:
—Utility taxation, 442.
Lackey, E. V.:
—Insulating paste for bolt heads, 766.
Leary, M. J.:
—Dog holds armature pinion, *648.
Locke, Dean J. & A. T. Clark:
—Extensive rolling stock rehabilitation at Baltimore, *248.

M

McAloney, W. H.:
—Ball bearing under brake handle, *223.
McCarty, H. W.:
—Surrounding men with conveniences, *583.
McClain, J. E.:
—Securing the facts is the basis of accident investigation, 470.
McDonald, G. R.:
—Motor generators supply power for Cleveland Terminal electrification, *633.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Abbreviations: *Illustrated. c Communications.

Digitized by Google

McGinnis, E. S.:
—Preventing loose breaker tips, *285.
—Testing air governors, *766.
McIntosh, R. S.:
—Loosening tight wires in conduit, *587.
McRae, W. R.:
—Special armature nut wrench, *285.
MacKay, D. S.:
—Washing buses in record time, *340.
MacMurray, G. J.:
—It's sand that keeps the wheels from slipping, *27.
Mall, I. O.:
—Track without ties built at New Orleans, *154.
Marsh, B. W. with J. R. Stauffer:
—Flexible progressive signal system aids traffic movement in downtown Pittsburgh, *261.
Matson, Theodore M.:
—Correct timing of signals essential in traffic regulations, *82.
Miller, John A. Jr.:
—Industry strengthened by trackage readjustment, *15.
—Nationwide survey shows electric railways proceeding with full budget program, 183.
Mitchell, C. S.:
—Statistics on Pittsburgh railways securities amplified, 153.
Mondoux, J.:
—Increasing truck-jaw life, *592.
Moses, G. L.:
—Installation and adjustment of compensating controller fingers, *337.
—Motor field shunting gives old cars new pep, 710.
—Proper lubrication prolongs life of control equipment, 199.
Munford, J.:
—Cars grounded on crown plate, *531.
—Lamp cord used for controller testing, 706.
—Removing trucks from cars on hoists, *284.
Murphy, Edmund J.:
—1929 was a successful year for the electrical railways, 318.

N

Nachod, Carl P.:
—Railway crossing signals should be distinctive, 99.
Neild, J. F.:
—Care essential in stringing trolley wire, *216.
Niederst, Martin F.:
—Ingenious jig speeds brake head drilling, *651.
—Oversize bearing housings bored in jig, *650.

O

Osborn, W. B.:
—Preventing grease from entering armature bearing, *224.
Otis, H. A.:
—Meeting the passengers' demand for greater comfort and convenience, *379.

P

Palmer, Stewart:
—Portable rack for special bus tools, *531.
Perkinson, T. F.:
—Double-voltage operation features Midland Utilities locomotive, *524.
Picklesimer, G. E.:
—Switch tongues built up by welding, *283.
Pirkle, A. G.:
—Hammer operated by compressed air, *225.
—Spray equipment effective for weed killing, *104.
Piwonka, William:
—Towing and spacer bar for disabled buses, *647.
Pontius, D. W.:
—Interurban revenues, *443.

R

Rainville, W. S. Jr.:
—Trolley buses installed on New Orleans shuttle line, *141.
Reinker, Christ:
—Blinker light protects linemen on night work, *651.
—Electrically heated inspection lamps, *161.
Richardson, G. A.:
—Improved trolley bus makes a bid for popularity, *371.
Richey, Albert S.:
—Electric railway costs and fares in 1929, *13.
Rose, L.:
—Bus hood clamp locks easily, *588.
—Connecting rod boring tool, *646.
Rose, Leonard S.:
—Pump and heater facilitate transmission filling, *764.
Ross, O. A.:
—Two-color and three-color signals, c98.
Rossell, W. T.:
—Speed—an essential of street car performance, *368.

S

Scott, Angus G.:
—Economical overhead for temporary crossovers, *533.
—Instruction school for linemen, *586.
—Use of dynamometer successful in stringing trolley wire, 281.
—Warning lights on tower wagons, *339.
—When should contact line be renewed? 709.
Scullin, Terance:
—Convenient machine for armature removal, *648.
—Filling sweeper broom blocks by machine, *706.
—Gage makes wheel mounting easy, *708.
—Jig for drilling brake hangers, *341.
—Steel plate safety shoes fitted to ladders, *589.
—Window guard painting machine, *283.
Senior, Herbert:
—Axle and armature bearing jig, *108.
Shoup, Paul:
—Co-operation is essential to meet 1930's challenge to transportation, *431.
—How the convention will benefit the industry, *354.
Silvus, Walter:
—New locomotives facilitate freight handling, *260.
Snow, William H.:
—Street car interurbans, 642.
Sohl, R. C.:
—Adjustable scaffold for car washing, *535.
—Cylinder boring device for air compressor, *651.
Spenzer, E. B.:
—Belt conveyor for loading concrete mixer, *536.
—Improved connecting rod for tongue switches, *162.
—Raised toe tongue switch, *338.
—Repairing switches for portable crossovers, *707.
Stauffer, J. R.:
—Bus operations are steadily expanded by electric railways, 20.
—De luxe bus finds wide application in interurban service, *144.
—Opportunities for profits in De Luxe bus operation, *91.
Stauffer, J. R. with B. W. Marsh:
—Flexible progressive signal system aids traffic movement in downtown Pittsburgh, *261.
Stevens, Hoy:
—Brake lining selected by test results, *647.
—Lighted brooms help coach cleaners, *226.
—Simple feeler gages, *706.
—Stand facilitates bus motor adjustment, *284.
Stewart, H. G.:
—Potential wires check electrolysis, *338.
Stocks, Carl W.:
—Improving the bus to increase its usefulness, *387.
Summers, L. E.:
—Operating delays reduced by practical instruction methods, *133.

T

Taurman, A.:
—Insulation tested with portable transformer, *763.
Taylor, Clarence P.:
—Traffic officers as transportation men, *128.
Thomas, David R.:
—Recent freight equipment trends assure a more profitable business, *398.
Traw, W. A.:
—Safety holder for dipping armatures, *161.

V

Vallecchi, Ugo:
—Rome to have modern subway, *526.
van der Stempel, Th. M.:
—Rolling stock purchases largely increased, *33.
Vickers, Leslie:
—Auditor as an analyst, *472.
von Pirch, E.:
—Warning signal insures proper meshing of gears, *588.

W

Warner, A. S.:
—Radio interference from cars eliminated by choke coil, *764.
Warner, A. T.:
—Development of the bus for mass transportation, *745.
Warner, W. E.:
—Proper fit of brushes reduces chatter, 164.
Welsh, J. W.:
—More power, 750.
Westinghouse Memorial dedicated, *689.
Williams, E. Bryan:
—St. Louis tags transfer passengers, 752.
—Center bearing lubrication simplified, *285.
—High voltage test discloses equipment weakness, *226.
Williams, H. S.:
—Lowering costs and bettering public relations by reducing noise, *376.
Wingerter, Laurence:
—Extensive rehabilitation places Des Moines in favorable position, *736.
Womack, F. C.:
—Effective sales promotion work by trainmen at Norfolk, 521.
Wood, C. W.:
—Slide valve grinder, *590.
Wright, G. I.:
—Reading Company's Philadelphia suburban electrification making rapid progress, *212.
Wysor, W. W.:
—Building better track, *403.

Y

Yeates, W. S.:
—Combination tie plate for various rails, *108.
—Emergency special work built in place, *339
—Track sand stored by compressed air, *590

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Abbreviations: *Illustrated. c Communications.

Digitized by Google

PERSONAL INDEX

(with biographical notes)

A

Adams, A. A. 296
Adams, Thomas 176
Addison, Dr. Thomas 297
Allen, William F. 725
Amidon, G. S. 725
Anthony, Wm. *645
Arkwright, P. S. 606
Armstrong, A. H. *781
Arnheim, W. W. 725
Artman, S. R. 492

B

Bahrenburg, Mrs. Carrie Alexander 62
Baker, F. K. 121, 176
Baldwin, Seth W. 352
Barrows, Oliver B. 241
Bell, W. R. 489
Belleville, F. E. *551
Bemis, E. W. 725
Berta, A. J. 173
Birney, Charles O. *348
Bixby, F. F. 177
Black, Alexander L. 241
Blewett, Scott H. 608
Blodgett, W. E. *293
Bock, E. J. 663
Bongard, Hermon 666
Booth, E. J. 720
Borger, John J. 298
Bowie, H. R. 782
Bradley, Alva *347
Bradley, C. L. *347
Bradley, Hugh 662
Brady, Nicholas F. *297
Bragassa, Augustine A. 176
Bragdon, Joseph H. 241
Braheney, B. F. 121
Bramgon, J. I. 493
Brennan, Joe 239
Briggs, W. W. 62
Brill, B. O. 552
Brock, James A. 177
Brooks, F. H. *174
Brown, A. George W. 176
Brown, B. R. *721
Brown, L. M. *604
Bruce, J. K. 490
Buchanan, C. B. 293
Bucher, Henry 120, 173, *604, 724
Buck, Morris 351
Bullington, L. C. 176
Burch, Edw. P. 120
Burke, T. P.* 779
Burley, Vine W. 296
Burns, W. R. *721
Burritt, M. C. 294
Busby, Leonard A. *665
Bush, Leroy C. 780
Butler, F. L. 491

C

Carlisle, I. Reid *62
Charlton, E. P. 783
Childs, R. B. 605
Chubb, L. W. 605
Clarkson, Coker F. 493
Clinch, R. F. 783
Clogher, Ambrose 352
Cone, Edward D. 175
Coons, Charles A. 725
Cosgrove, R. E. *551
Couch, C. P. 295
Couch, Harvey C. 725
Couzens, Frank 724
Crews, H. O. 121
Cross, Thomas A. *352
Cullen, J. E. 604
Cummings, F. A. 350
Cummings, Walter J. *662
Cutter, Wm. B. 725

D

Dahl, C. H. *293
Dahl, G. M. *721
Davidson, James *159
Davidson, R. J. *297
Davis, H. A. *492
Davis, J. A. *62
Davis, James Carey *608
Davis, W. E. 782
Davis, John E. 725
Davis, L. J. 61
Davison, Robert L. 351
DellPlain, Morse 239
Dicke, H. F. *723
Dickerson, C. W. 552
Dimmock, W. S. 782
Dinkey, John F. 177
Dohany, F. H. 119
Donnelly, M. T. 493
Draffan, G. L. *175
Duffy, James A. 122
Dunn, S. O. 351
du Pont, T. Coleman..... 783

E

Elliott, H. C. *662
Ellis, Charles J. 176
Emmons, C. D. ...240, *548, *722
Esson, J. L. 666

F

Faccioli, Guiseppe 550
Fagan, Maj. James A. 551
Ferguson, A. E. 295
Feustel, Robert M. 176, 293
Fishback, Jacob 783
Fisher, F. R. 666
Flemings, H. B. 663, *723
Flowers, Herbert B. 176, *550
Ford, Frank R. *665
Forman, R. C. *664
Forrey, George C. Jr. *349
Foster, J. I. 121
Frame, D. Ernest *349
Francis, A. E. 722
Frank, M. H. 490
Frazier, Walter Lee 177
Frederick, H. R. 239
Funk, Neill W. 782

G

Gaboury, Arthur 781
Gale, A. P. 240
Gallagher, R. A. 348
Gannon, F. J. 174
Gardiner, J. F. 604
Gardner, A. R. 176
Gass, Howard R. *174
Gereharty, Thomas 177
Gibson, W. H. *61
Godfrey, H. W. 119
Gordon, Wm. G. 493
Graham, R. N.* 778
Grant, Richard 159, 644
Green, G. H. 780
Green, Geo. R. 239
Greene, John E. 662
Greenland, J. A. 604
Gressens, Dr. Otto *296
Griffith, Thomas F. 666
Griswold, A. P. 662
Grover "Neb" *295
Guilfoyl, Frederick 666

H

Habercam, F. B. 329
Hadsell, Roy R. 60
Hallen, M. A. 663
Hamilton, J. F. *60
Hanbury, A. R. *605
Hardesty, C. H.* 779
Harker, Herbert E. 175
Harper, H. Holmes *490
Harton, W. H. 725
Harvey, A. E. *552
Harvey, Col. C. H. *173
Harvey, Spencer G. 175
Hayes, W. H. *159
Heacock, Charles J. 176
Hein, Caroline 120
Heinrichs, R. M. *491
Hennessey, David W. 783
Henry, A. H. 177
Henry, Carl D. 295
Hermann, R. L. 551
Herms, Charles *329
Herrington, L. B. 238, 723
Hickrod, W. R. 720
Higgins, H. C. 122
Hill, Aaron H. 175
Himel, R. O. 174
Hinkley, B. A. 724
Hirshfeld, C. F. *489
Hodges, A. LeRoy 348
Horner, J. A. 296
Horton, H. R. 350
Howland, W. S. 491
Hutcheson, Col. J. E. *294
Hutchinson, C. T. 177
Hymans, Edgar 176

I

Ingle, John P. *720

J

Jackson, W. P. 175
James, Col. R. H. 781
January, W. P. 663
Johnson, Chas. R. 352
Johnson, S. Jr. 606
Johnston, L. V. 548
Jones, Curtis F. 176
Jones, C. R. 664
Jones, G. W. *119
Jones, J. N. 60
Junkersfeld, Peter 241

K

Kearns, Laurence 663
Keller, George 664
Kimball, Charles S. 725
Kincade, C. A. 241
Klement, G. *779
Knight, W. W. 551
Kramer, Theodore Francis ... 550
Kyser, W. D. *549

L

LaMonte, Heber 664
Langan, T. R. *606
Ledlie, J. B. 174
Lee, Alfred C. 177
Leighton, John B. 122
Leonard, H. C. 489
Lloyd, M. M. 490
Locke, Fred M. 298
Long, C. T. 552
Lotz, J. R. 295
Ludwig, W. C. 550
Lummis, Herbert C. 780
Lundberg, A. J.* 780
Lux, Charles A. 122

M

McCabe, John F. 606
McCallum, J. B. 175
McConnell, Thomas A. 237
McCormick, M. E. 350
McCurdy, William H. 552
McCusker, T. A. 177
McGwinn, G. D. *347
McMorrow, Charles J. ...662, 725
McNally, J. J. 173
McPherson, J. C. 781
McRae, Walter R. *329
McWethy, Harold E. 120
Maag, Jacob H. 241
Mackinnon, L. 549
MacMurray, G. J. 351
Madden, James J. 351
Mahaffie, C. D. 604
Malone, Jim 121
Maltbie, Dr. M. R. 240
Mangum, Robert H. 725
Markham, Fred L. 725
Marsh, Burton W. *350
Marsh, John R. *348
Marshall, W. R. 489
Mathewson, Billy 61
Matthews, David E. 549
Maze, Harry 176
Meriwether, Richard *492
Merker, H. F. *724
Miles, E. K. 60, 121
Miles, L. D. 782
Miller, Frank H. 723
Miller, H. L. 352
Miller, Col. Otto *347
Miller, W. F. 293
Millican, G. R. 492
Minary, Thomas 173
Mitchell, E. A. 121
Moberly, Wm. A. 298
Mondoux, J. *645
Moore, B. H. 720
Moore, E. L. 549
Moore, T. Justin 782
Moorhaus, A. C. 782
Morrison, S. A. *296
Mozley, H. 176, 351
Murphy, Ernest 60
Myers, Albert E. 350

N

Naughton, J. G. 551
Needles, Wm. F. 297
Newman, J. C. *120
Newton, H. S. 492
Nicholl, H. A. *605
Nicholl, Thomas 552, *607
Norris, E. R. 240

O

O'Brien, W. L. 124
O'Connell, John B. *240
O'Laughlin, John 122
Onken, W. H. Jr. 176
Osgood, Harry A. 347

P

Page, Henry C. 663
Palk, L. F. B. *293
Palmer, B. C. 782
Paterson, A. B. *548
Peck, E. F. 240
Perkins, Col. A. T. 347
Peterson, S. J. 351
Pfeiffer, T. P. 349
Pierce, Armel W. 62
Pillsbury, Cecil R. 241
Plimpton, R. E. 350
Plummer, G. I. 721
Pogue, J. M. 491
Pond, J. Franklin 606
Porter, H. Hobart 351
Post, Frank T. 605, 662
Potter, J. P. 176
Pratt, F. C. 177
Pratt, Stuart A. 239
Prendergast, William A. ..174, 295
Pringle, P. J. 725
Pritchard, J. H. 720

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Abbreviations: *Illustrated. c Communications.

Digitized by Google

Pritchard, R. A. 61
Protzeller, H. W. *606
Pulcipher, K. D. 548

Q

Quick, C. H. 176
Quill, C. J. 60

R

Rae, Arthur L. 295
Rehnquist, Nelson L. 174
Reynolds, A. E. 722
Rich, J. 293
Rich, J. W. 240
Richardson, Guy A. *237
Riddle, Samuel *351
Ridgway, Robert 548
Robbins, N. C. 241
Robertson, W. A. 120, *237
Roggi, Charles J. *551
Roosevelt, W. Emlen 352
Root, Oren 490
Rose, Leonard S. *645
Rossell, W. T. 61
Rowland, Thomas H. 608
Royce, F. P. 120
Royer, J. E. E. 605
Russell, Herman 62
Rust, E. C. 491
Ryerson, W. N. 607

S

Sadler, W. Howe..... 664
Sammis, W. H.* 778
Sanders, E. B. 240, 296
Sapp, K. F. 491
Savage, Hugh 61
Sawyer, W. H. 724
Schildgen, Carl H. 548
Schoultes, Edward B. 176
Scott, Angus *329
Scott, Charles F. 121
Scott, N. J. 294
Scullin, James 352
Seagrave, L. H. 121
Seavey, C. L. 239
See, P. V. C. 778
Selbie, R. H. 493
Seymour, John A. 725
Sharley, John J. 662
Shaw, Glenn H. 724
Shelter, C. M. 120
Sheridan, J. B. *297
Sheridan, John H. 666
Sherman, Hugh 61
Siggins, Hugh A. 62
Sleeper, E. I. 177
Small, Oren A. 239
Smith, E. B. 720
Smith, H. W. *550
Smith, P. W. J. 491
Smith, R. R. 174, 239
Smith, Walter 550
Snider, J. R. 549
South, E. S. 608
Spencer, A. I. *122
Spencer, W. B. *607
Sperry, Elmer A. 493
Spink, Glen C. 348
Springer, W. A. 175
Spurr, A. C. 663
Stanton, W. J. 664
Stanton, Wm. P. 666
Starr, L. K. 351
Stearns, R. B. 121
Steffens, T. H. *238
Stephen, R. A. 725
Stephens, C. E. 489
Stout, E. W. *349
Strickler, J. M. *175
Sullivan, J. F. 297
Swift, W. H. Jr., ... 781
Symonds, N. G. 489

T

Taft, C. P. 177
Takada, H. 176
Tarbell, R. P. *664
Tate, Hugh M. 176
Tebbetts, George E. 176
Tew, F. J. 60
Thayer, E. F. 351
Theisinger, Earl F. 722
Theobald, Julius 122
Thomas, T. E. 489, *722
Thompson, Arthur W. *783
Thorne, L. E. 61
Thorne, L. S. 174
Thornton, Charles E. 294
Thornton, K. B. *294
Thorp, J. S. 720
Tighe, L. G. *119
Tilton, B. E. *60
Townsend, A. F. 239
Trotter, Geo. F. 663
Tsukada, M. 176
Tuteur, Irving M. 491
Tutwiler, T. H. *549

U

Uffert, John F. 60

V

van der Stempel, T. M. *490
Van Burington, P. 725
Vandeveer, Fred L. 348

W

Wair, H. R. 607
Walsh, Frank 663
Watson, D. E. 237, *295
Weatherwax, H. B. 60
Weber, H. P. *723
Weddle, W. W. 121
Weir, Harry 239
Welsh, M. E. 174
Welsh, Maurice A. 122
Wernsdorfer, John 241
White, Martin *782
Whiteman, F. O. 350
Whiting, F. T. 664
Whitney, L. C. *349
Whitney, Wm. A. 352
Whiton, H. S. 294
Williams, S. L. *62
Williams, Col. T. S. 493
Wills, G. S. 60
Winter, Edwin W. 493
Witt, Peter *238
Woeber, Chas. M. 298
Wood, A. H. *296
Wood, Henry B. 238
Woodworth, C. B. 241, 550
Worthington, Thomas 177
Wright, George 781
Wright, Roy V. 782
Wyatt, Horace 724, 782

Y

Yamawaki, H. 176

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

Volume 74 New York, January, 1930 *Number 1*

Accelerated Progress

FORECAST BY RECORD OF PAST YEAR

FIRM FAITH in the future is shown by the intention of the electric railways to spend almost $375,000,000 during the next twelve months for extensions, betterments and maintenance. Building slowly but surely on a firm foundation, the industry has steadily improved its position in recent years until today it looks forward with renewed confidence. Figures received by this paper from companies representing more than 97 per cent of the electrified track mileage of the United States and Canada show that the record of 1929 is more encouraging in nearly every way than the record of any other recent year. Estimates for 1930 indicate that even greater progress may be expected during the year just beginning.

Operating Results Improved

FINANCIAL results of operations in 1929 were notably better than in 1928. The total number of passengers carried by the cars and buses of the electric railways last year was slightly greater than during the preceding year. The average fare increased a fraction of a cent. Gross earnings showed a moderate gain. On the other hand, wages and construction costs remained fairly steady, and more efficient operation permitted a substantial reduction in expenses. As a result, net income was considerably improved. Apparently the recent disturbance in the stock market has had little, if any, harmful effect upon the electric railways. Despite some uncertainty concerning the general business outlook, indications are that revenue will be as good in 1930 as in 1929, or perhaps slightly better, and that operating expenses may be still further reduced.

Budget Figures Show Gain

EXPENDITURES made during 1929 for new plant and equipment, maintenance materials and supplies, and construction and maintenance labor, totaled more than $355,000,000. This total is about 4 per cent higher than the figure of similar expenditures made during the preceding year, and is slightly more than was forecast by this paper last January.

Estimates for expenditures during 1930 reflect clearly a recognition of the continuing need for rail service. An increase of $3,000,000, is indicated in expenditures for new cars, making a total of about $32,000,000. Way and structures expenditures will be increased $7,000,000 to a total of more than $88,000,000, not including the cost of regular maintenance work. The power and line budget shows a similar but somewhat smaller increase. At the same time continued expansion of bus operation is forecast by expenditures of some $20,000,000 estimated under that heading.

Rolling Stock Purchases Increased

APPROXIMATELY 1,400 cars were bought by the electric railways in 1929 as compared with less than 900 in 1928. Cars designed for carrying heavy loads in the larger

Digitized by Google

cities pre-dominated in the purchases last year, but it is notable that a considerable number of companies operating in the smaller cities are also found in the list of purchasers. Included in the total is one order for 300 rapid transit cars for New York City and several orders totaling more than 200 cars for multiple-unit operation in electrified suburban service. One hundred trail freight cars were bought by the electric railway industry, and 77 electric locomotives. Moreover, some 2,300 old cars were scrapped during the year.

Bus Operations Expanded

THE number of new buses bought last year was even larger than the number of new cars, being over 1,800. At the same time nearly 400 additional buses were acquired through the purchase by the railways of independent lines already in operation, making a total gain of about 2,200 buses. This increase is only a little less than that which occurred in 1928, a year of notable expansion in the bus operations of the electric railways. Some 700 buses were scrapped or otherwise disposed of. It is interesting to note that this is equivalent to 70 per cent of the number of buses bought by the electric railways five years ago. Extensions to existing bus routes and new routes added during 1929 totaled nearly 4,000 miles, a considerably larger increase than occurred during the preceding year.

Particularly significant is the increase in the number of trackless trolleys operated by the electric railways. After a promising beginning about ten years ago this type of transportation waned in popularity until it appeared to be on the verge of disappearing entirely. More recently, however, important improvements in the design of the vehicle have restored it to favor. While it is too early as yet to prophesy how far the adoption of trackless trolleys is likely to go in the future, it is evident that this type of vehicle has promising possibilities for rendering efficient transportation service under the conditions to which it is suited.

Volume of Trackwork Large

EXTENSIONS and reconstruction of electrified tracks totaled over 1,050 miles last year. Of this amount more than 850 miles represented increases and improvements to the trackage of the urban and interurban electric railways, and some 200 miles represented electrification of lines formerly operated by steam. While these figures show a slight decrease from the corresponding figures for 1928, they are considerably above the average for the past ten years.

Coincident with the additions made to the trackage and equipment of the electric railways, certain decreases also have occurred. Considerable track was abandoned during the year just ended, the total being approximately 1,000 miles. This is substantially less than the mileage of abandonments which occurred in 1928. Moreover, there was a marked reduction in the number and mileage of properties that were entirely abandoned.

Partial abandonments by companies which continued rail operation on other routes constituted by far the larger part of the decrease in mileage which occurred last year. From this it is evident that real progress is being made in co-ordination, rail service being retained where it is justified by the relationship between revenue and expense, and bus service being instituted in its place where conditions are more favorable for that type of operation.

Industry Strengthened By Readjustment

AS A NET result of these changes the electric railways find themselves at the beginning of the new year with a slightly reduced mileage of track, and a slightly smaller number of cars, but with a substantially larger number of buses and mileage of bus routes. Without doubt, this readjustment has greatly strengthened the position of the industry by enabling it more effectively to meet the transportation demands of the traveling public. That further readjustment along similar lines will occur during 1930 appears certain. From this it is not to be inferred, however, that wholesale substitution of buses for cars is in prospect. Substitutions will continue to be made where they appear to be advantageous, but the necessity for rail service on heavy traffic lines is steadily becoming more widely recognized.

These facts furnish convincing evidence that the industry is in a fundamentally sound condition. Notable progress was made during the year just ended and every indication points to an even greater advance in the year now beginning.

Digitized by Google

Electric Railway Industry in More Favorable Position

With revenues approximately the same as in the previous year, the companies have been able to make readjustments for reduced operating expenses, making the net revenue for 1929 the largest in the history of the industry. Statistics show the progress made over a period of years

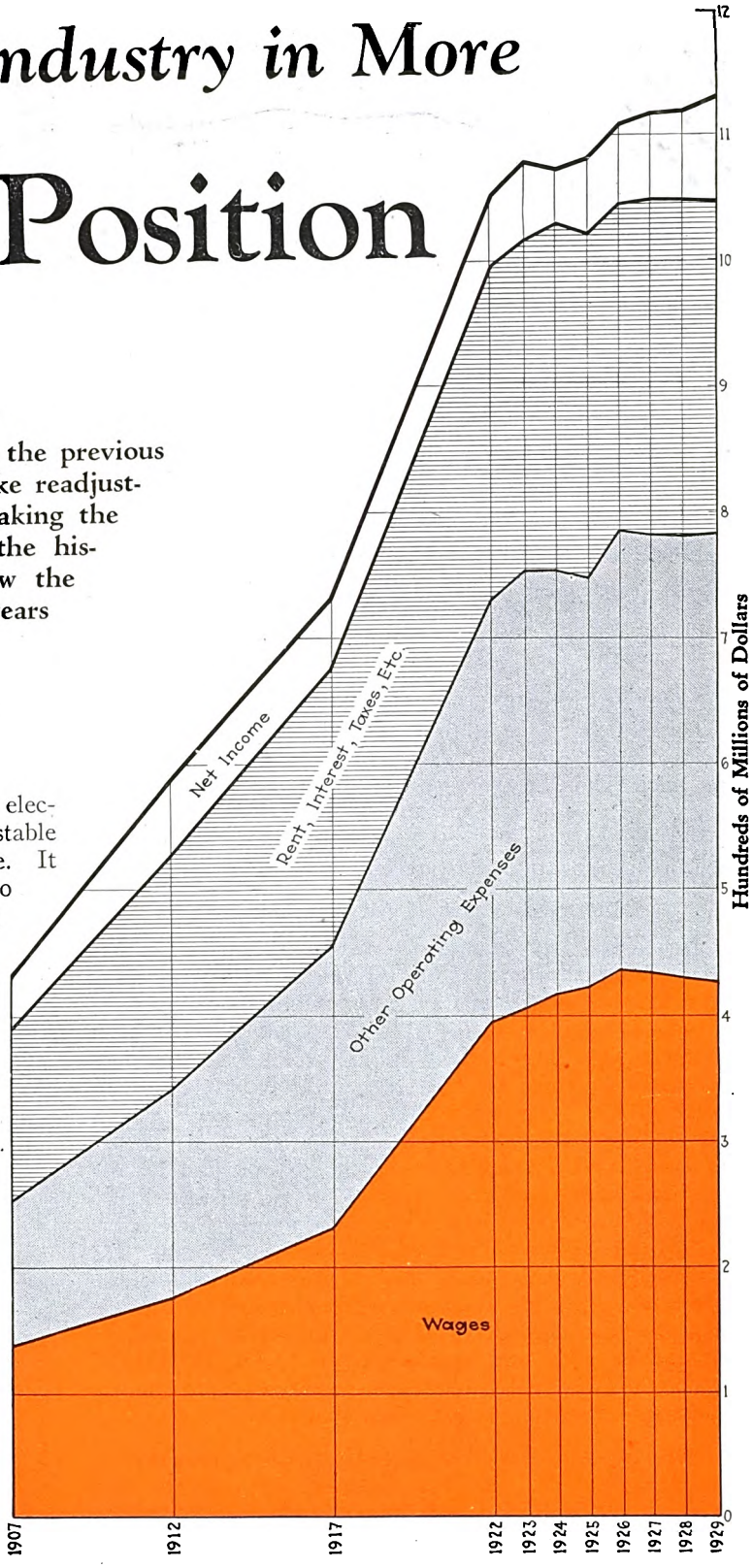


Fig. 1—Distribution of revenues of electric railways of the United States
Figures for 1907, 1912, 1917 and 1922 are from the U. S. Census, and for other years from data collected and compiled by the American Electric Railway Association.

WITH another year added to the record, the electric railway industry is found in a more stable position than it has been in for some time. It has continued during 1929 along lines similar to those followed in the previous year. The results of a number of influences that have been at work for some time are, however, only beginning to make themselves apparent, so that the industry has been able to make readjustment to the end that greater net revenues have been obtained. The increase in the number of automobiles used for private, urban and suburban transportation has continued at a pace only slightly retarded from its maximum of a few years ago. Even with this the revenues of the electric railways have held up. At the same time it has been found possible to introduce economies, some of them of a major character, so that expenses have not increased. As a result of these two trends acting together, the net income of the electric railway properties for the year, according to the preliminary estimates now available, actually will be the highest the industry has known.

Financial results for the past year's operations, shown graphically on the right edge of Fig. 1, may be compared at a glance with those of past years. This chart, which has been prepared with the assistance of the American Electric Railway Association, shows the financial history of the industry since 1907. The figures for the years 1907 to 1922, inclusive, are from the United States census of street and electric railways, and the others are from the association's records. Inspection of the chart shows that from a net income in 1907 of $40,000,000 retained out of gross revenues of $430,000,000, the business done by the electric railway properties has expanded so that last year the net earned was approximately $83,000,000 out of total revenues amounting to slightly less than $1,130,000,000. On a per cent basis the return has diminished considerably, the net income being 9.4 per cent of the gross in 1907 and only 7.4 per cent in 1929. However, the net income has been increasing steadily each year since 1924, when it was only 4.2 per cent of the gross. This change is of immense importance when the status of the industry as a going concern is under consideration. It is reflected in the improved standing of electric railways with financial interests generally. The approximate figures for the distribution of the expenses for the past year are: wages $424,000,000; other operating expenses,

Digitized by Google

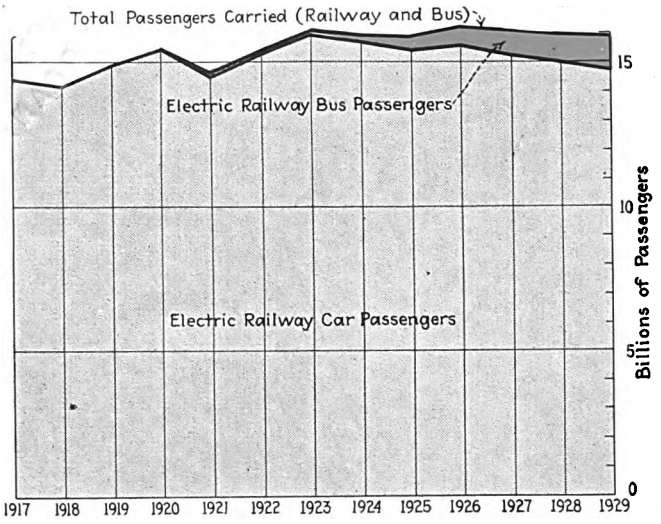


Fig. 2—Total annual passengers of United States electric railways and their bus subsidiaries

Compiled from U. S. Census figures for 1917 and 1922 and from A.E.R.A. data for other years.

$357,000,000; rents, taxes, interest and similar charges, $264,000,000. Wages thus represent 37.6 per cent of the total revenue. Other operating expenses are 31.6 per cent, and rents, interest, etc., are 23.4 per cent of the gross revenue. The ratio of operating expenses to gross revenue stood at 69.2 per cent, which is less than the operating ratio in any recent year.

Passenger Traffic Almost Constant

In number of passengers carried the industry has shown but little change from year to year for some time. In a number of the smaller communities there has been a reduction in riding on street cars, but this has been balanced to a large extent by an increase in the riders on buses operated by the street railway interests. In some of the larger cities there has been a gain in both car and bus passengers. Fig. 2 shows the total number of passengers carried on the vehicles operated by the electric railway companies from 1917 on, separated into car and bus riders. In this chart the figures for electric railway passenger traffic are based on the 1917 and 1922 United States censuses of electric railways, while those for other years are estimates of the American Electric Railway Association. The total number of passengers carried in 1929 was approximately 15,830,000,000, of which 14,740,000,000 were car passengers and the remaining 1,090,000,000 were bus riders.

Miles of Route Covered Expanded Greatly in Ten Years

The track mileage and mileage of bus routes operated by electric railway companies are shown graphically in Fig. 3. During the period from 1917 down to the present there has been an increase of enormous proportions in the length of streets, highways and private rights-of-way over which street and electric railway cars and buses are run. The chart shows that in 1918 there were some 45,000 miles of electric railway tracks and 2,630 miles of electrified steam railroad in the United States. At that time there were no bus routes, and none were recorded until 1920, when there were about 1,000 miles. From year to year there have been minor suspensions of service on tracks which were non-productive, or where buses could be used to replace the cars to advantage. These abandonments have been offset to some extent by extensions of track. In practically every instance where such extensions have been made they were justified economically, as it now is possible to use the bus for extensions of service into territory where there is uncertainty of the need for it. In a number of instances the necessity for maintaining track and rehabilitating it has disappeared, since it is possible to use buses to replace it to good advantage without continuing the liability for excessive taxation and paving charges which in the past have been assessed against the electric railway companies and have proved a severe handicap to successful operation. Where service is not too heavy this plan has proved advantageous.

In other instances abandonment of track has resulted from the need for more direct routing. Many lines were laid out without regard to obtaining the most direct or fastest service, but were distorted to satisfy real estate operators and others who for one reason or another demanded a deviation from the best route. In such instances the bus has usually been accepted as a substitute over the route which best serves the patrons at the present time. The abnormal rise in construction costs without a corresponding rise in revenue caused a situation due to which some of the smaller railway companies were unable to survive the onslaught of much higher operating expenses without an adequate amount of traffic. Then, too, the advent of the private automobile took away sufficient traffic that certain lines became unremunerative.

It is a matter of common understanding that in the heyday of the promotion of electric railway lines 20 to 30 years ago many miles of track were constructed that never should have been built. The territory in which they were placed was not, and could not be, productive of sufficient traffic to warrant them. Although they were a drag on the system, the remainder brought in sufficient revenue to carry the loss. When the war came, bringing in its wake greatly increased costs of operation and maintenance, and when the number of passenger automobiles increased to a total undreamed of in the days

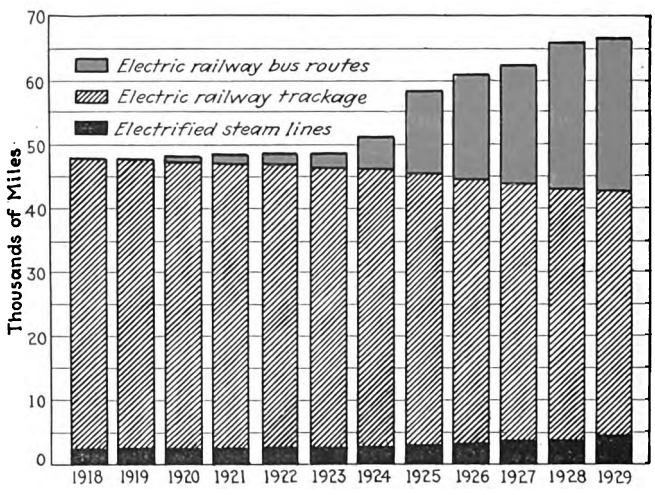


Fig. 3—Electric railway track and bus route mileage in the United States

Figures compiled by Electric Railway Journal.

of the promoters, all within the space of a few years, such unwarranted railway lines were wiped out. Some of them were replaced by bus lines, but in other instances no public transportation of any sort is now given. While the process has been going on for several years, it is not yet completed. There still is some rail-

Digitized by Google

way track that was uneconomically located at the beginning, and which is a drag on the more prosperous portions of the systems.

Little Change in Number of Vehicles but Capacity Increases

Despite the large numbers of cars and buses that are retired annually, there has been little change in the total number for the last several years. At present there are approximately 111,000 cars and buses in use in the United States, of which 73,768 are passenger cars and 11,854 are buses. The remainder are divided between electric locomotives, freight, service, and miscellaneous cars. It is noteworthy in this connection that the improvement in electric railway cars has made possible the retirement of large numbers of obsolete vehicles and their replacement by a smaller number of new, fast, light-weight cars that are operated today to give an increased number of car-miles. The buses likewise are vastly improved from those that were first introduced, so that comparisons of numbers alone do not give an adequate picture of the change that has been wrought in the past ten years or so. Fig. 4 merely indicates the increase in vehicles that has taken place from 1917 to the present time.

A measure of the actual service rendered by the industry is given in Fig. 5, which shows the vehicle-miles of the cars and buses operated by electric railway systems for the past thirteen years. More and more service is being rendered to the public year by year, as will be noted by a comparison of the vehicle-miles in this chart and the number of passengers carried in Fig. 2. When it is remembered that the modern cars and buses are larger, and not only have more seats but more standing room, the increase becomes even more noteworthy.

Traffic Holds Up Despite Unfavorable Industrial Situation

Another trend which may be noted with considerable interest is the relation between industrial employment and riding. During the four years shown in Fig. 6 there has been comparatively little change in the employment index, save for a relatively brief period in 1928. In the summer of that year the index fell to a low

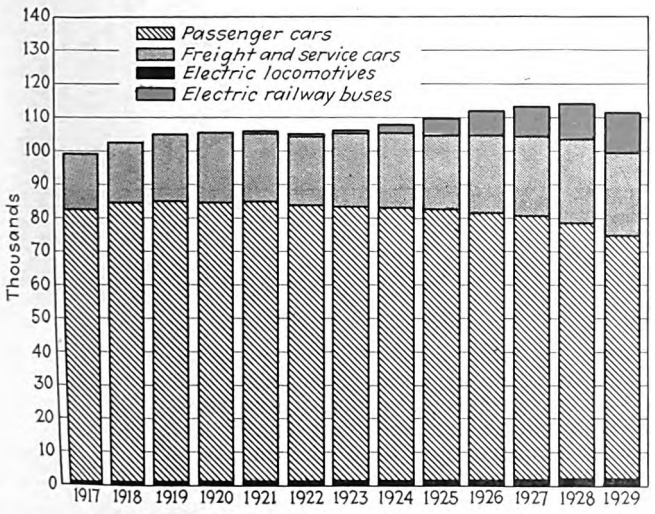


Fig. 4—Cars and buses of the electric railways of the United States
Figures compiled by Electric Railway Journal.

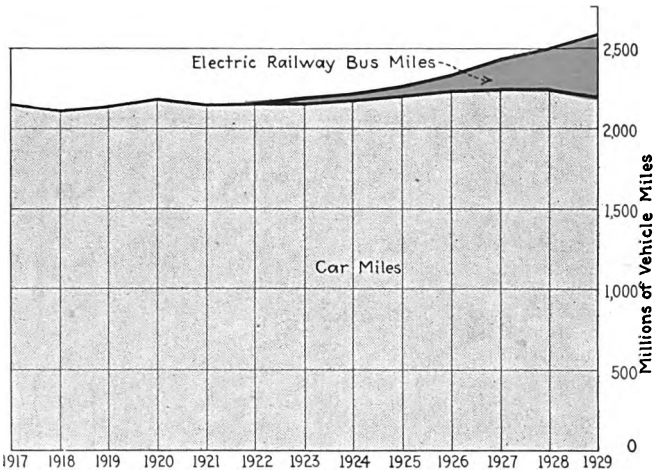


Fig. 5—Revenue vehicle-miles operated annually by United States electric railway systems
Car-miles for 1917 and 1922 from U. S. Census, for other years from A.E.R.A.

figure of 93.1, where it remained for two months, recovering to a present high of 98.5, as compared with 101.2 in the fall of 1926. Passenger traffic, on the contrary, has not followed this trend directly, if at all. It reached a high value of 101.43 in March, 1927, falling gradually and with minor fluctuations to 97.37, the index for October, 1929. There was no drop in riding corresponding with the low employment figure of 1928, and hence there was no corresponding rise during the present year with the improvement in the labor situation.

Undoubtedly a long period of depression would have a more marked effect on the riding habit. On the other hand, it probably would cause a reduction in the use of automobiles, as the operating cost of the motor vehicle would in that instance require a more careful analysis by its owner, who today is interested far more in its convenience as compared with public transportation. As there has been no such period of depression since the automobile has become a large factor in local transportation, the best estimates of what would happen in such an event are little more than guesses. It appears probable, judged by past depressions, that the loss of riding would be decidedly less than the reduction in employment, and under today's conditions there might even be an increase. That, however, is purely a matter of conjecture.

Automobile Affects Riding Less than Popularly Supposed

Many writers have laid all the ills of the transportation industry to the growth in use of the passenger automobile. Fig. 7 shows how far from the truth is the idea that the industry has received a death-blow from this source. The riding habit, or number of rides per capita, is the best measure available for the use made of transportation vehicles. In the period shown it has ranged between 101 and 116, the high figure being reached in 1923, which was the banner year for street car riding. Contrasted with this is the increase in the registration of automobiles, which has gone up from 35 per thousand of population in 1917 to 189 in the year just closed. Naturally it might be expected that the great increase in a new mode of transit would cause a reduction in riding on public vehicles so great that their operation, even in large cities, would be unprofitable. Instead, with a 50 per cent increase in registrations since 1923, the reduction in car and bus riding has been from

Digitized by Google

Statistics of City and Interurban Electric Railways and Electrified Steam Lines

(As of January 1, 1930)

	Number of Operating Companies	Miles of Track	Passenger Cars		Electric Locomotives	Freight Cars		Service Cars	Buses Operated	Miles of Bus Route
			Motor	Trailer		Motor	Trailer			
New England States										
Connecticut	8	1,290.51	1,395	105	146	54	8	214	217	542.90
Maine	12	422.93	321	8	7	25	69	94	5	25.00
Massachusetts	25	1,912.67	3,773	288	6	23	12	752	713	1,131.87
New Hampshire	11	125.03	172	0	2	0	1	30	41	71.48
Rhode Island	3	301.74	585	9	3	15	0	113	164	160.60
Vermont	4	20.10	7	0	3	2	1	3	23	32.20
Eastern States										
Delaware	1	70.02	113	0	0	0	0	15	22	47.49
District of Columbia	5	395.06	862	24	6	2	13	109	144	287.98
Maryland	5	667.75	1,277	156	3	28	95	148	231	1,602.14
New Jersey	13	1,164.16	2,679	100	0	5	0	327	2,458	3,184.75
New York	71	5,275.54	16,056	2,773	203	196	87	1,524	831	947.73
Pennsylvania	78	3,889.03	6,876	261	9	117	82	931	892	1,518.93
Virginia	13	677.30	684	61	16	10	7	82	247	171.43
West Virginia	10	635.34	365	0	19	25	28	54	128	642.05
Central States										
Illinois	49	3,245.18	6,327	975	80	88	2,787	766	463	1,371.73
Indiana	24	2,496.17	1,619	89	23	426	519	436	443	1,330.46
Iowa	23	984.32	614	43	39	13	1,036	193	150	1,089.18
Kentucky	7	495.49	731	71	0	24	0	126	84	77.21
Michigan	22	1,273.50	2,208	295	27	57	153	254	1,036	1,855.57
Minnesota	8	694.71	1,198	26	2	1	0	99	117	144.54
Missouri	14	1,152.26	2,281	186	5	14	22	338	179	248.56
Ohio	49	3,267.08	3,475	585	26	173	577	645	986	1,878.72
Wisconsin	15	767.03	1,199	54	8	8	4	42	310	1,471.92
Southern States										
Alabama	10	329.53	397	62	2	3	0	61	15	24.24
Arkansas	7	119.23	233	10	0	2	0	17	20	20.60
Florida	7	209.82	382	2	0	2	2	24	90	67.15
Georgia	7	370.42	535	21	2	8	10	44	69	45.39
Louisiana	8	285.65	787	47	0	2	0	78	61	72.76
Mississippi	7	24.00	35	0	0	0	0	3	56	35.20
North Carolina	8	321.97	205	10	17	4	159	40	60	39.02
South Carolina	4	60.16	72	0	0	3	0	9	9	32.70
Tennessee	9	455.01	593	53	3	2	1	71	49	366.04
Western States										
Arizona	3	24.46	33	0	0	3	0	3	13	22.98
California	26	3,464.55	4,093	229	103	67	2,953	428	592	1,410.41
Colorado	9	342.70	366	127	9	2	220	86	46	69.70
Idaho	1	0	0	0	0	0	0	0	11	17.00
Kansas	15	431.47	268	23	14	66	29	38	121	166.69
Montana	8	705.15	105	14	50	35	1,430	32	5	3.50
Nebraska	4	183.88	452	20	3	1	1	67	54	42.49
North Dakota	3	25.54	42	1	0	0	0	9	4	4.95
Oklahoma	11	378.84	231	27	19	83	67	34	140	177.79
Oregon	5	684.73	609	76	24	4	481	116	62	71.40
South Dakota	1	0	0	0	0	0	0	0	27	574.28
Texas	22	1,025.84	1,314	46	5	28	16	142	295	399.88
Utah	7	472.45	262	60	14	4	344	58	27	78.94
Washington	18	1,293.08	936	64	47	203	128	69	135	279.71
Wyoming	1	0	0	0	0	0	0	0	9	28.50
U. S. Total	671	42,431.40	66,767	7,001	945	1,828	11,342	8,724	11,854	23,885.76
U. S. Possessions	5	125.39	268	0	1	29	0	25	98	67.78
Canada	57	2,505.86	3,831	368	65	244	469	449	499	983.76
Grand Total	733*	45,062.65	70,866	7,369	1,011	2,101	11,811	9,198	12,451	24,937.30

*Includes 55 companies which now operate only buses.

FIGURES presented in this table are based on reports received by ELECTRIC RAILWAY JOURNAL during December, 1929, from companies representing more than 97 per cent of the total electrified track mileage of the United States and Canada, supplemented by reports previously received from other companies. The number of companies shown is the number of actual operating companies and does not include subsidiaries whose physical property has been absorbed by merger, etc., nor holding companies which do not operate under their own names. Track mileage and equipment data of interstate companies are listed according to the actual location of track. In addition to the number of cars shown in this table there are in the United States and Canada a total of 3,374 miscellaneous cars which have not been listed by states.

Digitized by Google

116 to 101. Furthermore, with the automobile registration standing at virtually one for every five people, little additional competition from this source is likely, and an increase in the riding habit on account of the difficulty of operating motor vehicles in the modern city may be looked for from now on.

Readjustment of Fares Has Been Gradual

While it is not possible to make a complete analysis of the fare situation in a review of this nature, the trend of fares in the past thirteen years can be seen clearly in Fig. 8. Before the war practically all the city companies had a basic 5-cent cash fare, frequently supplemented with reduced rate tickets. By 1917, when the chart begins, 271 out of the 297 companies included still had the 5-cent base charge. One had zone fares, 24 had 6-cent cash fares, and the remaining company 7 cents. In the next year many companies went to 6

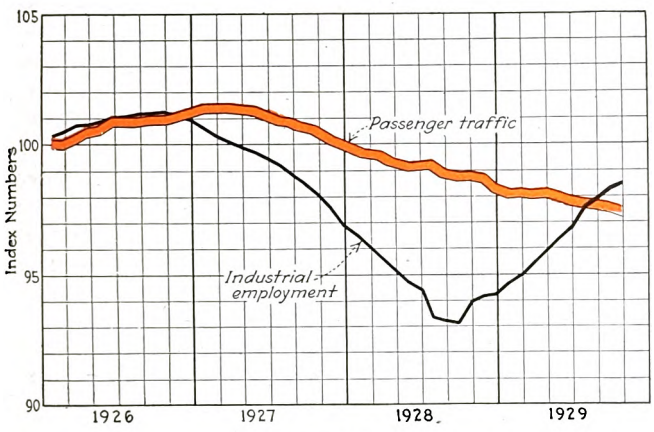


Fig. 6—Trends of passenger traffic and industrial employment in the United States

Passenger traffic is from data reported by 201 companies to the A.E.R.A., and the data on employment from the U. S. Bureau of Labor Statistics.

cents, several to 7 cents, and a few to 8 cents. The 10-cent cash fare appeared in 1919 and the 9-cent fare in 1920. In that year all but 64 of the companies had obtained a cash fare higher than 5 cents. The succeeding years have seen the growth of the 10-cent base rate and a still further reduction of the 5-cent fare, as at the end of 1929 only 33 companies retained the low rate. The 6-cent fare also has fallen from popularity, being confined to 13 properties. Seven cents is charged on 56 systems, 8 cents on 44, 9 cents on only one and 10 cents on 126, while zone fares are in use on 24 systems. Attention should be called to the fact that reduced rate fares of one form or another are in use on a considerable number of the companies included in the chart, which would reduce the average fare considerably. On the contrary, no bus fares are included. Since in the majority of instances the bus fares are higher than the street car fares the number of higher rate companies would be augmented if they were included.

Industry Statistics Presented

Statistics of the industry have been compiled by this paper, and are presented in the table on page 6. The figures have been obtained from a canvass of the individual companies, supplemented by information previously published in the McGraw Electric Railway Directory. The new information, however, covers more

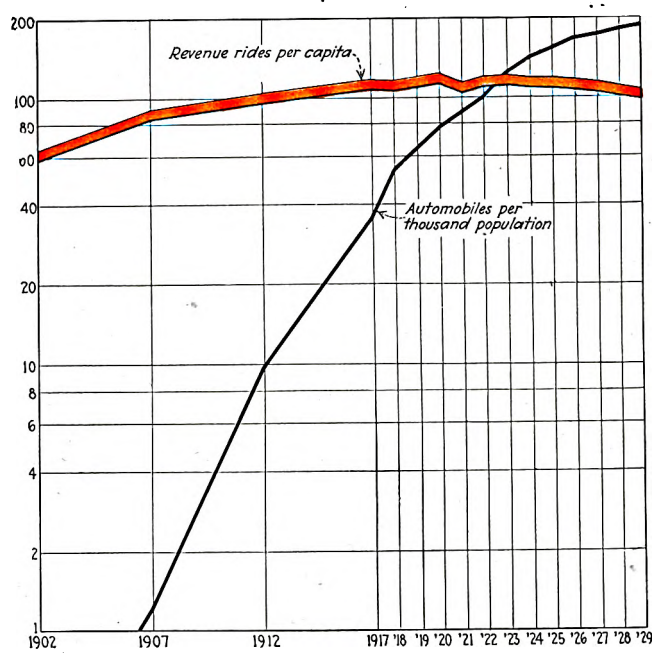


Fig. 7—Effect of private automobiles on passenger transportation in the United States

Electric railway traffic figures for 1917 and 1922 are from the U. S. Census, the remainder are A.E.R.A. estimates. The passenger automobile registrations are supplied by the National Automobile Chamber of Commerce.

than 97 per cent of the systems of the United States and Canada. It may be accepted as the best available information extant.

At the beginning of this year there are 671 operating electric railways in the United States. They have 42,431 miles of track and approximately 24,000 miles of bus routes. The number of cars owned includes 73,768 passenger cars, 945 electric locomotives, 13,170 freight cars, and about 12,000 service and miscellaneous cars. In addition these companies or their subsidiaries own nearly 12,000 buses.

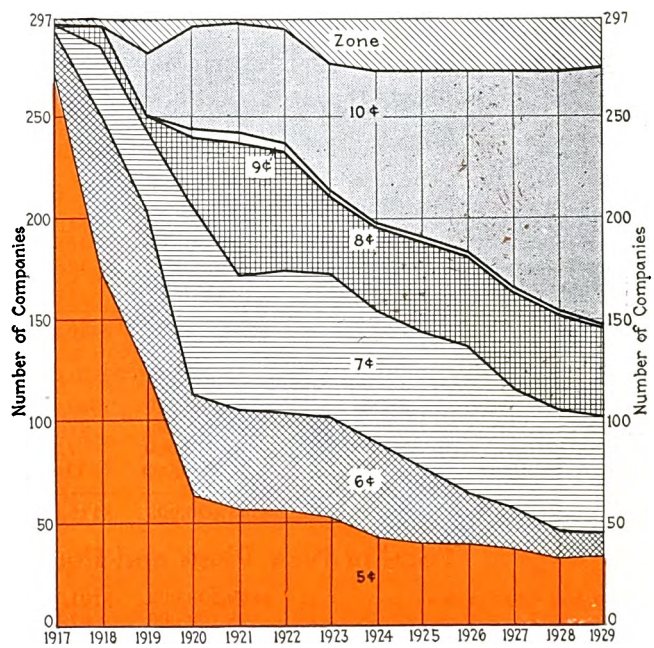


Fig. 8—Distribution and trend of fares of electric railways

Based on 297 companies operating in 280 cities of the United States having a population of 25,000 or more, as reported to the American Electric Railway Association.

Digitized by Google

Expenditures for Improvements

Budget increase in 1929 exceeded that of 1928, reflecting continued betterment of railways' financial condition. Rolling stock expenditures show greatest increase. Both maintenance material and labor totals rise. Estimates for 1930 forecast further increases.

CONTINUING the upward climb which started in the year of 1928, following the low ebb of 1927, the total expenditures for new plant and equipment and maintenance materials in the electric railway industry in 1929 again exceeded those for the preceding year. Moreover, it is noteworthy that the expenditures of 1930 will exceed those of 1929 by an even greater margin. During the years 1925, 1926 and 1927 the totals receded steadily. The figure for 1927, however, represented a smaller decrease than attended the previous figures and it was predicted at the time that the next year would show a slight increase and the following years slightly greater increases. This trend has been borne out, not only for 1928 and again for 1929, but also in the forecast for the new year, 1930. From $225,271,000 for 1927 to $225,730,000 in 1928 and to $236,005,000 for 1929 are the actual figures. $459,000 and $10,275,000 are the increases for the respective years. Budgets for 1930 submitted by the electric railways indicate that the total will soar to $251,530,000, representing an increase of $15,525,000 or 6.58 per cent.

In view of the somewhat disturbed condition of general business brought about by the recent market crash, the figures of 1929 and the forecast of 1930, both showing increases, are of real significance. They emphasize again the fundamental stability of the electric railway industry and its relative immunity to fluctuations in trade. Expenditures for the past year were not curtailed in any instance and most of the electric railways reporting showed increases for 1930. In a survey made by the American Electric Railway Association for President Hoover the railways reported the same plans. It was stated in the association's announcement, following the survey that the railways would spend more than $1,000,000 a day for equipment and various construction activities in 1930. Actual figures show that the total amount will be $371,220,000, representing $149,050,000 for new plant and equipment, $102,480,000 for maintenance materials and $119,690,000 for maintenance labor.

As mentioned in the interpretation of the budget figures last year, the electric railways had been planning extensive improvement programs for some time, but hesitated in carrying them through because of trifling uncertainties. With the great improvements in car design of the past few years and the reassurance that local transportation cannot be dispensed with, many properties have gone ahead with rehabilitation plans. It was stated last year that the purchasing power of the industry was rapidly being restored and that a steady climb could reasonably be looked for in the following years. This forecast was borne out in 1929 and in the budgets for 1930.

Perhaps the outstanding trend indicated by the figures, aside from the continued climb in the total, is

Purchases Planned by Electric Railways for 1930, Compared with Actual Figures for Past Years Compiled by "Electric Railway Journal"

New Plant and Equipment—Capital

	1925	1926	1927	1928	1929	Forecast 1930
Way and structures	$52,400,000	$51,200,000	$77,365,000	$90,050,000	$81,890,000	$88,400,000
Cars	50,400,000	40,000,000	34,758,000	18,900,000	28,710,000	31,800,000
Buses	15,680,000	17,540,000	14,368,000	19,100,000	17,300,000	19,900,000
Power equipment	5,150,000	7,640,000	3,561,000	7,300,000	7,570,000	8,950,000
Total	$123,630,000	$116,380,000	$130,052,000	$135,350,000	$135,470,000	$149,050,000

Maintenance Materials—Operating

Way and structures	$56,900,000	$50,000,000	$40,517,000	$31,040,000	$35,800,000	$35,790,000
Cars	54,700,000	47,800,000	36,941,000	35,200,000	36,350,000	36,520,000
Buses	7,370,000	7,500,000	9,451,000	15,040,000	17,925,000	19,650,000
Power equipment	22,650,000	11,370,000	8,310,000	9,100,000	10,460,000	10,520,000
Total	$141,620,000	$116,670,000	$95,219,000	$90,380,000	$100,535,000	$102,480,000

Total of New Plant and Equipment, and Maintenance Materials

Way and structures	$109,300,000	$101,200,000	$117,882,000	$121,090,000	$117,690,000	$124,190,000
Cars	105,100,000	87,800,000	71,699,000	54,100,000	65,060,000	68,320,000
Buses	23,050,000	25,040,000	23,819,000	34,140,000	35,225,000	39,550,000
Power equipment	27,800,000	19,010,000	11,871,000	16,400,000	18,030,000	19,470,000
Grand total	$265,250,000	$233,050,000	$225,271,000	$225,730,000	$236,005,000	$251,530,000

Digitized by Google

Mount Upward

By
CLIFFORD A. FAUST
Assistant Editor *Electric Railway Journal*

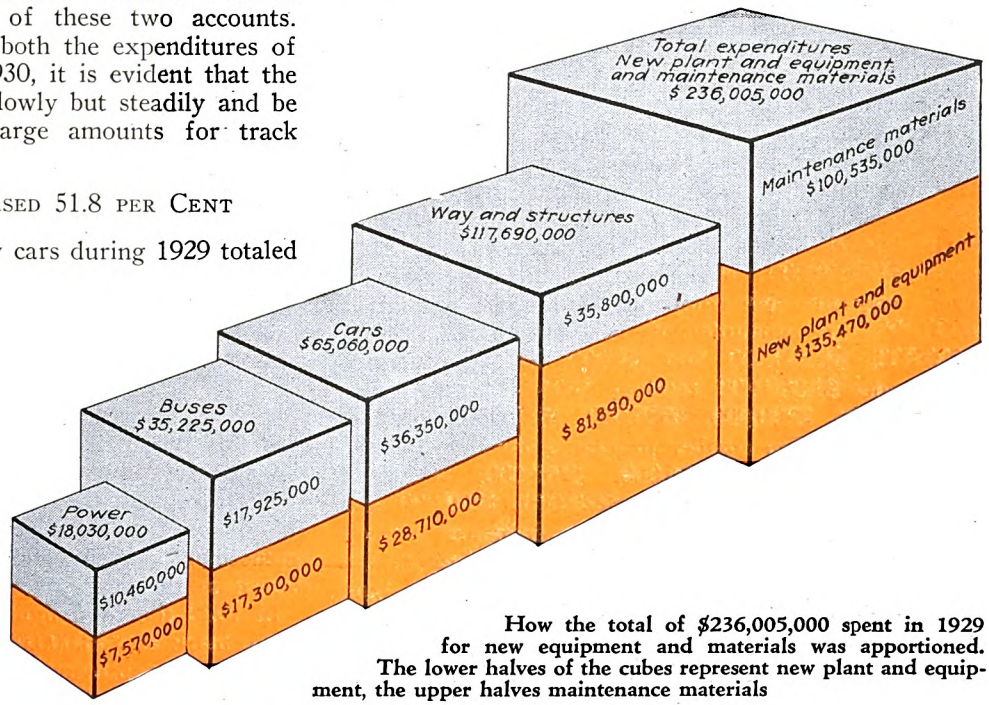
the buying movement in rolling stock, following and now accompanying a period of great track activity. Last year's low mark of $18,900,000 for cars and the high mark of $90,050,000 for way and structures indicated that operators were preparing for the extensive purchase of new equipment by conditioning their track. Their budgets submitted a year ago also showed the same trend, giving an estimate of approximately $30,000,000 for cars in 1929 and slightly under $80,000,000 for way and structures. Actual expenditures in 1929 of $28,710,000 for cars and $81,890,000 for way and structures bear out the trend as foreseen. The predicted increases of 7.95 per cent for way and structures and 10.76 per cent for cars indicate a return to normalcy in the relation of these two accounts. Surveying the past trends in both the expenditures of 1929 and the forecasts for 1930, it is evident that the buying of cars will increase slowly but steadily and be accompanied by reasonably large amounts for track reconstruction.

Car Purchases Increased 51.8 per Cent

Actual expenditures for new cars during 1929 totaled $28,710,000, an increase of $9,810,000, or 51.8 per cent, over 1928. Definite information received last year indicated that several large orders for car equipment would be placed. All of these and several others were placed during the year. Among the outstanding orders of the year were 300 subway cars for the City of New York, 141 suburban motor cars for the Delaware, Lackawanna & Western Railroad, 106 for the Cleveland Railway, 101 for the City of Detroit, 101 for the Brooklyn & Manhattan Transit Corporation, 100 for the Chicago Surface Lines, 50 for the Montreal Tramways and 25 for the Market Street Railway. Other large orders were 42 locomotives for the New York Central Railroad and 22 heavy passenger locomotives for the Cleveland Union Terminals Company. Total orders of new equipment for the year were 77 electric locomotives and approximately 1,400 cars, including freight, express and service cars.

That the large number of cars purchased in 1929 is not an unusual number is indicated in the budgets of 1930, which show that cars purchased in that year will even exceed in value those of 1929. Definite orders totaling 522 were shown on the budgets submitted. Of this number 417 will be ordered by nine companies in lots of 135, 66, 60, 50, 32, 23, 20, 16 and 15, respectively. An important evident trend is that many of the smaller companies will order cars in 1930, increasing their percentage which in the past years has not been very high. In view of the fact that the smaller cities are having more difficulty than the larger ones this is particularly encouraging. Although no definite announcements have been made of large orders for rapid transit or steam road electrification equipment, it is not unlikely that at least one or two such orders will be placed. Considering the low figure for 1928, when car purchases were at an ebb, there is much reason for optimism with the present outlook. It appears that the extensive experimentation and development of modern equipment, which delayed car purchases for a time, will be rewarded in a normal resumption of buying.

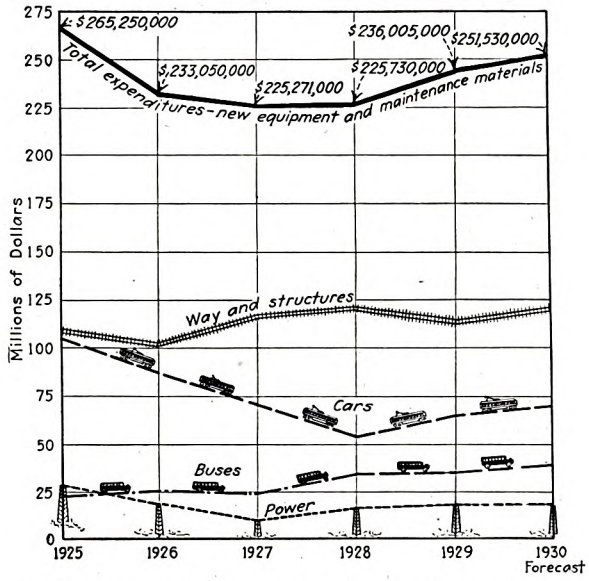
As forecast a year ago the expenditures for way and structures, charged to capital accounts, showed a recession in 1929. The total dropped from $90,050,000 to $81,890,000, a comparatively small amount considering the large increase in car purchases. It also should be remembered that the figure for 1928 was a high mark for this account, since these figures were first compiled in 1923, and that the 1929 figure of $81,890,000 exceeds all other totals except the one for 1928. That this activity in track is to continue is indicated in the forecast for 1930 of $88,400,000, an increase of $6,510,000. No doubt the way and structures account will continue to exceed the $80,000,000 mark in succeeding years.



How the total of $236,005,000 spent in 1929 for new equipment and materials was apportioned. The lower halves of the cubes represent new plant and equipment, the upper halves maintenance materials

During the past year more than 700 miles of track was rebuilt, over 165 miles of track extension was made and approximately 200 miles of steam railroad lines was electrified. These figures compare with slightly more than 890 miles of rebuilt track in 1928 and 230 miles of extensions. Structures, of course, account for an appreciable percentage of the total way

Digitized by Google



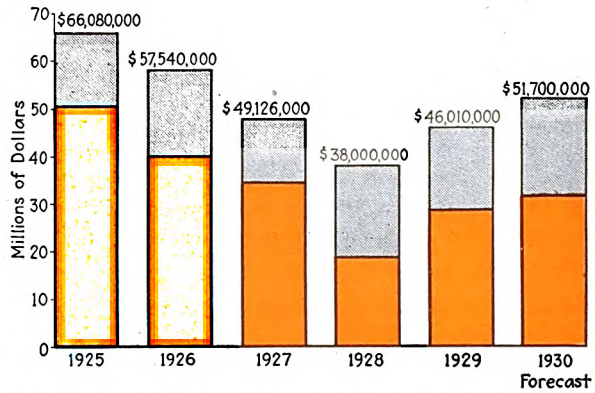
Distribution by individual accounts of new plant and equipment and maintenance materials, for the years 1925 to 1929, inclusive, and the forecasts for 1930. Note the upward turn following 1927

and structures figure. Since structures and track are not segregated on the budget blanks it is impossible to give the exact proportions of the two.

As mentioned previously, way and structures will total $88,400,000 in 1930. It was definitely indicated on the budget blanks that 22 companies would alone expend $17,110,000 for this account. Representing the larger programs, five companies will spend a total of $9,000,000, in amounts of $3,000,000, $2,500,000, $1,300,000, $1,200,000 and $1,000,000. Seven programs under $1,000,000, totaling $4,942,000, are $889,000, $800,000, $700,000, $685,000, $655,000, $633,000 and $580,000. Ten smaller programs, totaling $3,168,000, are $487,000, $466,000, $367,000, $350,000, $349,000, $261,000, $250,000, $229,000, $209,000 and $200,000. These programs in many instances are accompanying large orders for equipment. Others are probably the forerunners of rolling stock buying, just as many orders of 1929 followed the extensive track rehabilitation in 1928.

Falling slightly short of the high mark for buses in 1928, but practically equaling the second highest mark for 1926, expenditures for new buses during 1929 totaled $17,300,000. This figure compares with $19,100,000 for 1928, $14,368,000 in 1927 and $17,540,000 for 1926. The actual number of new buses bought totaled more than 1,800 in 1929 as compared with approximately 2,100 in 1928. An increase of $2,600,000, however, is forecast by the electric railways for 1930. This increase, together with increases of practically the same percentages in the other three capital accounts indicates a steady and normal expansion in every department.

Adding 1,800 new buses during 1929 brings the total now being operated by electric railways to more than 12,400. Since a large number of these have been in service for more than five years a considerable proportion of the buses bought this year were for replacement. This proportion should increase in the following years. With the steady expansion which has character-



Combined values of cars and buses bought during 1925-1929 and the forecasts for 1930. The lower portions represent cars, the upper portions buses. The 1929 and 1930 figures indicate a pronounced climb from the low point of 1927

ized this type of service since it was first adopted by the electric railways, and the ever-increasing number for replacement, the sales should continue to be high. In one or two more years the number of buses for replacement actually should exceed the numbers purchased in the years of its expansion.

In 1928 the total figure for cars and buses reached a low mark at $38,000,000. This followed similar decreases in the previous years, the total for 1925 being $66,080,000, that for 1926 being $57,540,000 and that for 1927 being $49,126,000. It was predicted in pre-

Maintenance Materials and Labor

		Way and Structures	Cars	Buses*	Power	Total
1927 Expenditures	Material	$40,517,000	$36,941,000	$9,451,000	$8,310,000	$95,219,000
	Labor	66,874,000	44,952,000	6,592,000	8,244,000	126,662,000
	Total	$107,391,000	$81,893,000	$16,043,000	$16,554,000	$221,881,000
1928 Expenditures	Material	$31,040,000	$35,200,000	$15,040,000	$9,100,000	$90,380,000
	Labor	50,400,000	49,300,000	11,870,000	6,580,000	118,150,000
	Total	$81,440,000	$84,500,000	$26,910,000	$15,680,000	$208,530,000
1929 Expenditures	Material	$35,800,000	$36,350,000	$17,925,000	$10,460,000	$100,535,000
	Labor	52,800,000	49,380,000	13,540,000	5,730,000	121,450,000
	Total	$88,600,000	$85,730,000	$31,465,000	$16,190,000	$221,985,000
1930 Estimated expenditures	Material	$35,790,000	$36,520,000	$19,650,000	$10,520,000	$102,480,000
	Labor	51,360,000	50,200,000	12,470,000	5,660,000	119,690,000
	Total	$87,150,000	$86,720,000	$32,120,000	$16,180,000	$222,170,000

*Bus maintenance materials include replacement parts, tires and tubes.

	1929	Forecast 1930
Bus operating supplies, including fuel and lubricants	$20,720,000	$22,510,000

Digitized by Google

vious articles that 1928 would be the low year, and it was. Mounting to $46,010,000 the total for 1929 exceeded that for 1928 by $8,010,000 and almost reached the combined figure for 1927. It is of particular significance that the total for cars and buses in 1930 will continue to climb, reaching $51,700,000. This figure will be an increase of $5,690,000 over 1929 and will exceed the totals for the three previous years.

Expenditures for new power equipment in 1929 were $7,570,000, exceeding the 1928 figure by $270,000. Because of several rather extensive programs being planned and under way the total for 1930 will amount to $8,950,000. Among the larger expenditures for new power equipment of the past year were those for the Cleveland Union Terminal electrification and the Lackawanna project.

Following a slight recession in the year 1928 the total of maintenance materials, charged to operating accounts, showed an increase of $10,155,000, or 11.2 per cent. All of the accounts showed increases, the first time since these figures have been compiled. The new total was $100,535,000, compared with $90,380,000 for 1928. Way and structures showed an increase of $4,700,000; cars, $1,150,000; buses, $2,885,000; and power equipment, $1,360,000. The way and structures increase is accounted for in the increased expenditure in track maintenance accompanying the decreased amount of track reconstruction. During 1928, when the new plant and equipment for way and structures showed a large increase, the maintenance materials dropped. In 1929 the two accounts were reversed, the capital account showing a decrease and maintenance an increase. During 1930 maintenance materials for way and structures will remain practically the same, varying only $10,000.

One of the most encouraging results of all the maintenance figures is the increase shown in maintenance materials for cars. From the time these figures were first compiled car maintenance materials have decreased each year. Although the increase shown in 1929 is not a very large one it does indicate that the downward turn has been stemmed. The decrease in 1928 was much smaller than in any previous year, which indicated that no doubt the low point would be reached in the first part of 1929 and then go upward. The actual total for 1929 and the forecast for 1930, showing another increase, proved that this theory was true.

Exceeding the previous high mark of $15,040,000 by $2,885,000 the 1929 total of bus maintenance materials reach a new high mark at $17,925,000. This figure includes replacement parts, tires and tubes, but not fuel and lubricants. Bus maintenance materials have shown a steady climb, the increases being almost in direct proportion with the number of buses being used by the electric railways. During 1930 the total will again increase, reaching $19,650,000.

Bus operating supplies, including fuel and lubricants, totaled $20,720,000 for the year. This figure is the first one obtained on the budget blanks, so that no comparison can be made with previous years. However, this figure should increase more nearly in proportion with the number of buses in operation than the maintenance materials. In 1930 this account will increase to $22,510,000. It is interesting to note that fuel and lubricants actually exceed the cost of replacement parts, tires and tubes.

Maintenance materials for power equipment showed an increase of $1,360,000, reaching the figure of $10,460,000. In 1930 materials for power plant, substation and line maintenance will show another increase. It appears from the figures for the past three years and the forecast for 1930 that this account will vary but little each year.

With the exception of power all departments showed an increase in 1929 of expenditures for maintenance labor. Way and structures showed an increase of $2,400,000, cars an increase of $80,000, and buses one of $1,670,000. These increases brought the total for maintenance materials for 1929 up to $121,450,000, an increase of $3,300,000. The most consistent increases are shown by buses, this account mounting from $6,592,000 in 1927 to $11,870,000 in 1928 and $13,540,000 in 1929. The forecasts for 1930 indicate that maintenance labor for every account will remain practically the same.

Because all of the maintenance material accounts showed increases in 1929 over 1928 and maintenance labor varied little, the combined total for both maintenance materials and labor showed an increase. From the previous figure of $208,530,000 the total mounted to $221,985,000. The combined total for 1930 is set by the industry at $222,170,000. It is of real significance that the totals for each account increased. Maintenance figures ordinarily do not fluctuate because maintenance practices on individual properties do not vary much within a period of twelve months. Increases in every account, therefore, can only indicate that the railways are bettering their standards of maintenance.

In the article of last year the percentages were computed of maintenance materials to the total of materials and labor. Budgets for 1929 indicated that the percentages were practically the same as for 1928, being 40.3 for way and structures, 41.2 for cars, 57.0 for buses, 64.5 for power and 45.3 for the total.

Outstanding Facts Revealed by the Budget Data

DURING 1929

The total for new plant and equipment and maintenance materials showed an increase of $10,275,000.

Car purchases totaled $28,710,000, an increase of $9,810,000, or 51.8 per cent.

Power equipment expenditures for both new plant and maintenance material increased.

Total maintenance materials increased from $90,380,000 to $100,535,000.

DURING 1930

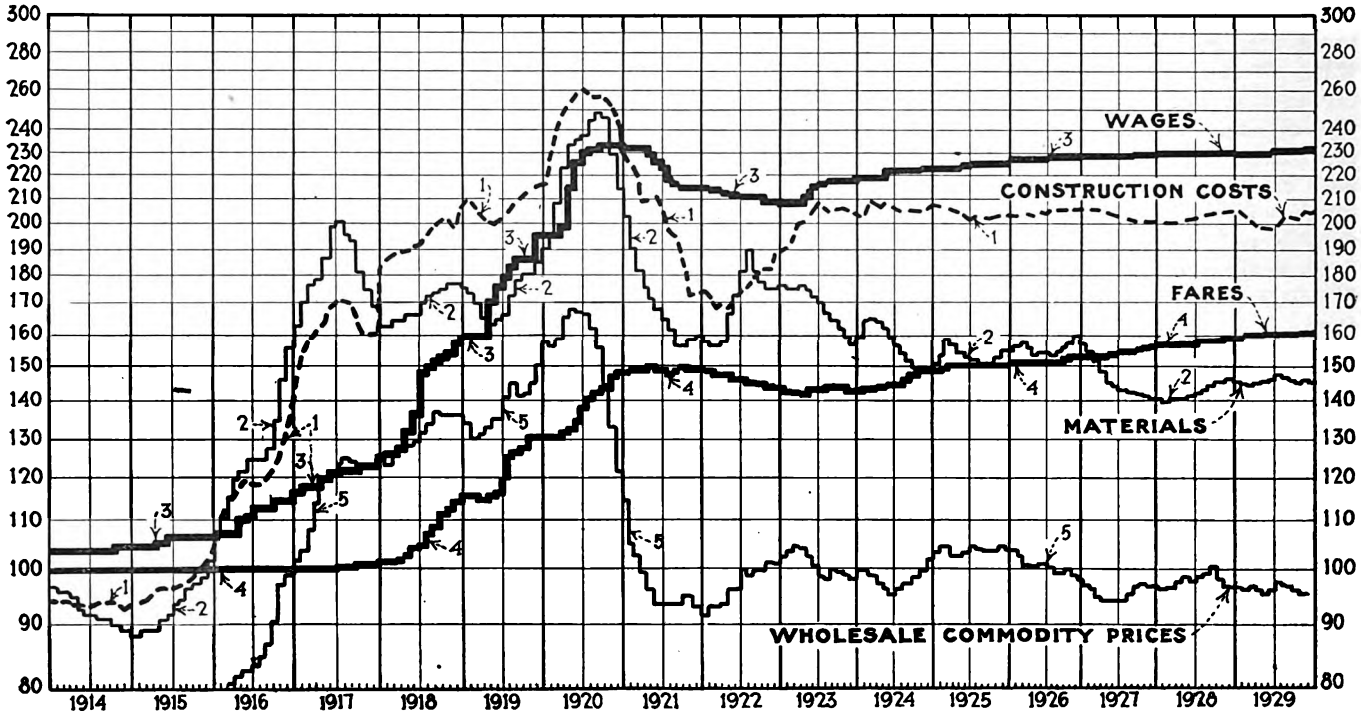
The total of all expenditures for new equipment and maintenance materials will increase more than in 1929, reaching the mark of $251,530,000.

Car purchases will again be high and will exceed those of 1929.

Both buses and power equipment will increase.

Maintenance materials and labor will not vary much from the 1929 figures.

Digitized by Google



Trend of Construction and Operating Costs, Wages and Fares, 1914-1929

1. Electric railway construction costs (according to American Electric Railway Association).
2. Electric railway operating materials costs (Richey). Includes fuel for power, weighted according to average use in maintenance and operation.
3. Electric railway wages (Richey). Maximum hourly wages of platform men, weighted according to number of men.
4. Street railway fares (Richey). U. S. cities (except New York), weighted according to population.
5. Wholesale commodity prices (U. S. Bureau of Labor Statistics).

AVERAGE FARES AND COSTS 1913-1929

Base 1913 = 100

	Street Railway Fares (Richey)	Elec. Ry. Operating Materials Costs (Richey)	Electric Railway Wages (Richey)	Elec. Ry. Construction Costs (Am. Elec. Ry. Assn.)	General Construction Costs (*Eng. News-Record*)	Wholesale Prices, All Commodities* (U. S. Bur. Lab. Stat.)
1913.....	100.0	100.0	100.0	100.0	100.0	69.8
1914.....	100.0	92.6	104.2	94.0	88.6	68.1
1915.....	100.1	93.5	106.2	97.3	92.6	69.5
1916.....	100.1	126.2	111.6	119.8	129.6	85.5
1917.....	100.5	181.9	120.6	162.7	181.2	117.5
1918.....	106.2	168.8	140.5	192.5	189.2	131.3
1919.....	120.7	172.2	174.0	205.1	198.4	138.6
1920.....	137.2	224.6	217.3	244.7	251.3	154.4
1921.....	148.9	169.9	222.7	200.7	201.8	97.6
1922.....	146.0	170.0	210.0	175.2	174.4	96.7
1923.....	142.9	168.0	212.1	200.2	214.1	100.6
1924.....	149.2	156.0	219.2	204.6	215.4	98.1
1925.....	150.2	153.1	222.2	202.4	206.7	103.5
1926.....	152.2	155.0	225.3	202.6	208.0	100.0
1927.....	154.6	145.7	227.5	201.1	206.2	95.4
1928.....	157.7	142.2	229.3	203.1	206.8	97.6
1929.....	160.2	145.6	230.6	202.4	207.0	.....

*Base 1926 = 100.

MONTHLY INDEX OF FARES AND COSTS FOR PAST FOUR YEARS

Base 1913 = 100

1926	Street Railway Fares (Richey)	Elec. Ry. Operating Materials Costs (Richey)	Electric Railway Wages (Richey)	Elec. Ry. Construction Costs (Am. Elec. Ry. Assn.)	General Construction Costs (*Eng. News-Record*)	Wholesale Prices, All Commodities* (U. S. Bur. Lab. Stat.)
January....	151.2	154.3	223.8	202.2	207.2	103.6
February...	151.8	155.3	223.8	201.9	206.6	102.1
March.....	151.9	156.4	224.1	202.0	207.6	100.4
April.....	151.9	154.2	224.7	201.3	207.0	100.1
May.....	151.9	153.1	225.4	202.4	207.3	100.5
June.....	152.1	154.4	225.5	201.9	204.8	100.5
July.....	152.0	154.1	225.7	203.2	207.8	99.5
August.....	152.0	153.1	225.9	203.6	208.3	99.0
September..	512.0	154.2	226.1	203.2	208.3	99.7
October....	152.8	155.4	226.2	202.9	209.8	99.4
November..	153.2	156.6	226.3	203.7	210.8	98.4
December..	153.2	159.2	226.3	203.2	210.8	97.9
1927						
January....	153.2	156.0	226.6	203.5	211.5	96.6
February...	153.8	154.0	226.7	202.9	210.2	95.9
March.....	153.4	152.1	226.7	203.0	208.8	94.5
April.....	153.4	148.0	226.9	202.6	209.0	93.7
May.....	153.6	144.2	227.4	201.0	206.8	93.7
June.....	153.6	143.0	227.5	200.6	205.6	93.8
July.....	155.2	142.9	227.8	199.9	203.7	94.1
August.....	155.3	142.1	227.9	200.9	205.5	95.2
September..	155.5	141.6	228.0	199.4	203.6	96.5
October....	155.7	141.8	228.2	199.8	204.4	97.0
November..	156.1	141.3	228.3	199.4	202.0	96.7
December..	156.2	140.6	228.4	200.7	203.9	96.8
1928						
January....	156.7	140.6	228.6	200.9	203.9	96.3
February...	156.7	139.5	228.7	200.9	204.6	96.4
March.....	157.2	140.1	228.8	200.5	204.6	96.0
April.....	157.2	140.0	228.8	201.2	206.4	97.4
May.....	157.3	140.4	229.2	201.9	207.0	98.6
June.....	157.3	141.4	229.2	202.7	206.2	97.6
July.....	157.7	141.8	229.2	203.3	206.6	98.3
August.....	158.0	142.5	229.7	204.5	207.3	98.9
September..	158.1	144.2	229.7	204.4	207.3	100.1
October....	158.2	144.9	229.9	205.5	207.7	97.8
November..	158.9	145.1	229.9	205.7	209.5	96.7
December..	159.3	145.5	229.8	205.1	210.2	96.7
1929						
January....	159.3	145.3	229.9	204.5	209.4	97.2
February...	160.0	145.0	229.9	205.2	210.4	96.7
March.....	160.0	144.8	230.1	203.4	207.8	97.5
April.....	160.0	145.0	230.1	200.9	203.4	96.8
May.....	160.2	145.5	230.1	199.5	205.2	95.8
June.....	160.3	145.8	230.8	199.7	205.6	96.4
July.....	160.3	147.5	230.8	199.0	204.8	98.0
August.....	160.3	146.4	231.0	200.8	205.9	97.7
September..	160.3	146.1	231.0	203.4	207.6	97.5
October....	160.3	145.6	231.1	203.0	206.3	96.3
November..	160.6	145.7	231.1	204.8	208.5	94.4
December..	160.6	144.9	231.1	205.1	209.5	.....

*Base 1926 = 100.

Digitized by Google

Electric Railway

Fares and wages continue to increase, but in a smaller measure than during 1928 and 1927. Commodity prices and construction costs maintain a level practically the same as during the past three years

Costs and Fares in 1929

By
ALBERT S. RICHEY
Electric Railway Engineer,
Worcester, Mass.

FOR several years past the ELECTRIC RAILWAY JOURNAL has published monthly in its financial and corporate section a series of index numbers compiled by the writer under the heading of "Conspectus of Indexes." This conspectus is made up of indexes showing the trends of street railway fares and of the costs of electric railway wages and materials entering into electric railway operation; costs of construction, both electric railway and general; wholesale commodities in general; retail food; cost of living, and some others. In the annual statistical numbers of the JOURNAL, the first issue in January each year, beginning in 1923, charts and tables have been presented showing the trend since 1913 of the most important of these indexes as affecting electric railway operation. In Fig. 7 herewith is shown a similar chart indicating the trend of five of these indexes from January, 1914, through the latest available figures for 1929. The indexes there shown are: (1) Electric Railway Construction Costs, as computed by the formula of the American Electric Railway Association; (2) Electric Railway Operating Materials Costs, including fuel for power; (3) Electric Railway Wages; (4) Street Railway Fares; (5) Wholesale Prices of All Commodities, as computed by the U. S. Bureau of Labor Statistics.

The methods used in the computation of these five indexes were described fully on page 37 of the JOURNAL for Jan. 2, 1926, in an article which also contained a tabulation showing the numerical values of the various indexes monthly from January, 1920, through December, 1925. The earlier monthly numerical values, from January, 1914, through December, 1919, may be found on page 19 of the Journal for Jan. 5, 1924. A tabulation herewith shows the numerical value of six of the indexes yearly from 1913 through 1929, and monthly beginning with January, 1926, and these six indexes also are shown graphically for the past four years on a somewhat larger scale than in Fig. 7 by the charts Figs. 1 to 6, inclusive.

The weighted average street railway fare, as shown by the Richey index in Fig. 1, has increased during 1929 from 7.71 cents to 7.78 cents, an increase of 0.8 per cent during the year. This is a slowing up of the rate of increase in the average fare, as this index showed a 2 per cent gain in 1928 following a 2 per cent gain in 1927. Ten of the 143 cities which affect this index reported increases in street railway fares during 1929, the most important of these increases being in Louisville, Minneapolis and St. Paul. Other changes were of less importance as affecting the index, either on account of the smallness of the changes or the relatively small population involved. It will be noted that the index of the American Electric Railway Association, which is also shown in Fig. 1, shows not only a higher average

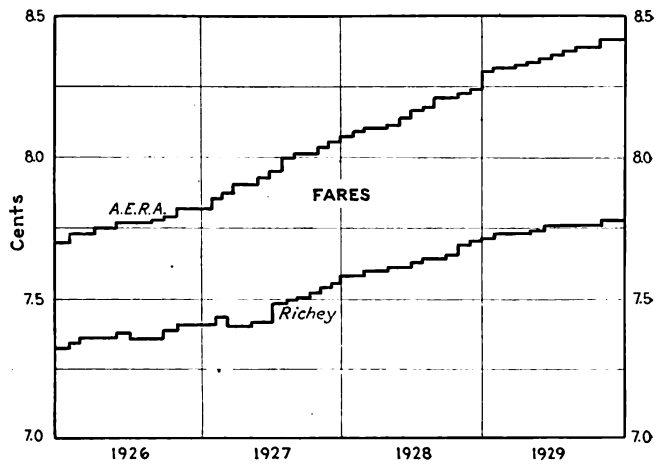


Fig. 1—Street Railway Fares (1913 = 4.8425 cents)

fare, but a slightly greater increase in the average than does the Richey index. This is on account of the fact that the American Electric Railway Association Fare Index includes all cities of more than 25,000 population, is an average of cash fares only, and is not a weighted average, so that each city is of equal importance in the final average regardless of its size or the number of passengers affected by the fare. On the other hand, the Richey index includes only cities of more than 50,000 population (excluding New York City), and in computing the average the fares are weighted in accordance

Digitized by Google

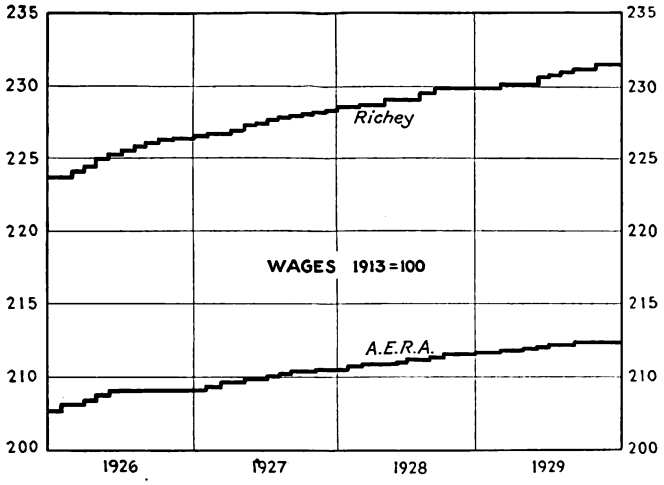


Fig. 2—Electric Railway Wages

with the populations of the cities; further, for each city where reduced rate tickets are used consideration is given to both cash and ticket rates, except that children's or workmen's tickets or other forms of special reduced rates are not included.

Electric railway wages, as shown by the indexes in Fig. 2, have continued the gradual upward trend which started in 1923. The Richey index which includes wages on 130 street and interurban railways, weighted in accordance with the number of trainmen employed on such railways, shows an increase of about 0.6 per cent during 1929 and now stands at 231. The principal increases in wages have been in Chicago, St. Louis, Indianapolis, Cincinnati, Louisville, Ft. Wayne, Toledo, Wilmington and Memphis, these cities being named in the order of the effect of the 1929 wage change on the index. The American Electric Railway Association Wage Index uses wages on 85 railways and is unweighted with respect

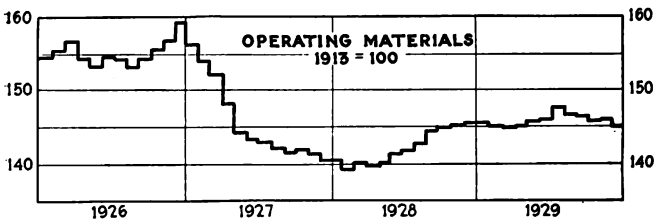


Fig. 3—Electric Railway Operating Materials

to the number of men employed. Both indexes indicate about the same measure of increase in trainmen's wages during the past four years.

A computation of an index of "real wages" of electric railway trainmen as compared with 1913 and 1914 may be made by dividing the index of wages by the index of the cost of living. This indicates an index of "real wages" (on the base of 1913-14) of 141.5 at the end of 1929, which may be compared with 141 at the end of 1928 and 138 at the end of 1927. Such increases in the "real wages" index for street railway employees show their steadily increasing opportunity to better their standard of living.

The cost of electric railway operating materials was maintained at a fairly uniform level during 1929. This index, as shown by Fig. 3, declined from a high of 159 in December, 1926, to a low of 139.5 in February, 1928, and recovered to practically its present level by November, 1928. It should be borne in mind that in the make-up of this index, fuel for power enters into it with a weighting of 40 per cent.

Electric railway construction costs have remained very steadily at about their present level since the middle of 1923, as indicated by the American Electric Railway Association Construction Cost Index, shown on page 12

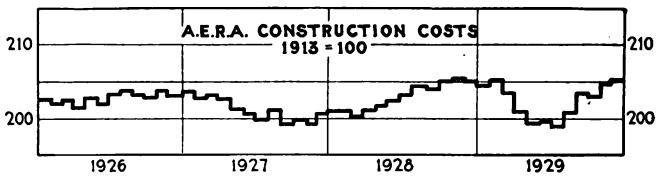


Fig. 4—A.E.R.A. Electric Railway Construction Costs

and on a larger scale for the past four years in Fig. 4. This index of electric railway construction costs may be compared with the general construction cost index of the *Engineering News-Record,* which is shown in Fig. 5 for the past four years. The latter includes structural steel and other building materials in a considerably greater weighting than such materials are used in the Electric Railway Construction Cost Index, which is

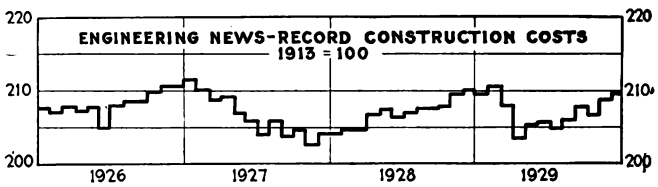


Fig. 5—Engineering News-Record Construction Costs

somewhat stabilized by the heavier weighting of steel rail, the price of which has remained constant since October, 1922. The Electric Railway Construction Cost Index has, however, a heavier weighting of the common labor rate, which started the year at about 56 cents, dropped to 53 cents during the summer months, and has recovered to 56½ cents at the end of the year.

The Wholesale Commodity Index of the United States Bureau of Labor Statistics is shown for the past four years in Fig. 6, and from 1916 on in the large chart. Its level during 1929 has been not greatly different from that of 1928. This index is the only one of those presented here which has a base other than the year 1913. The base of 1913 = 100 for the Wholesale Commodity Index was discontinued in August, 1927, and since then it has been calculated on the base of 1926 = 100 and is so shown in the accompanying tables and charts.

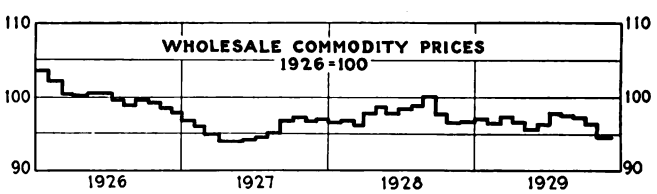


Fig. 6—Bureau of Labor Statistics Wholesale Commodity Prices

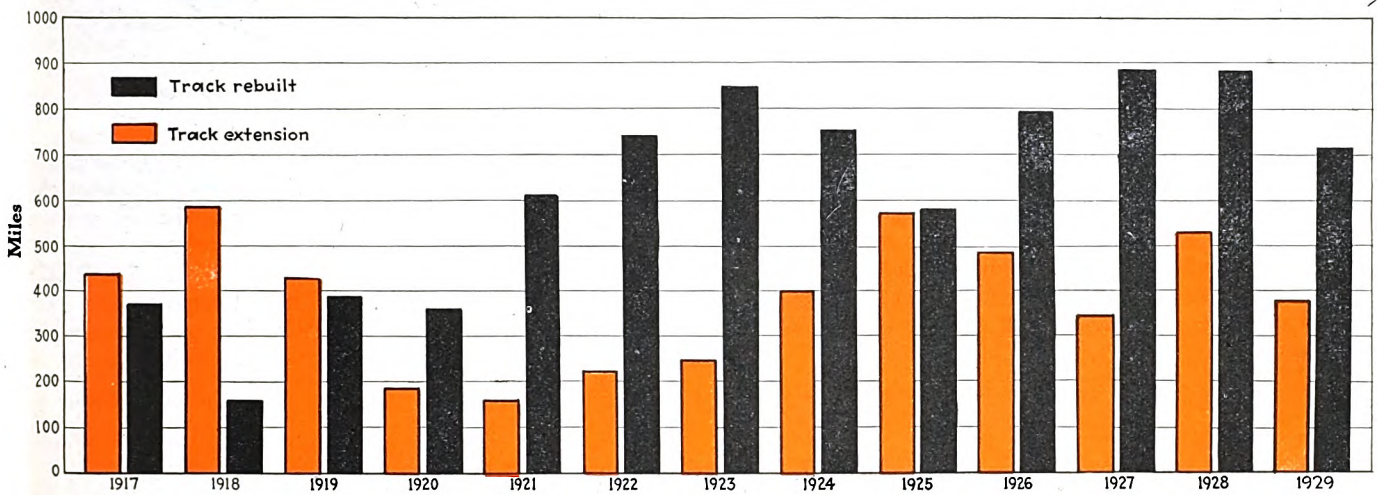
Favorable indications in the index figures are the even trends of prices for several years, continuing through 1929, along with an increase in fares. The only disturbing element is the uptrend of wages, making them an increasing item in operating cost. Otherwise all the indications for the coming year are favorable.

Digitized by Google

Industry Strengthened by

Trackage Readjustment

By
JOHN A. MILLER, JR.
Managing Editor
Electric Railway Journal



Summary of track extensions and reconstructions since 1917

Survey of changes which have occurred during past ten years shows that extensions made by electric railways have largely offset abandonments of unprofitable lines. Despite the steady growth of bus operation the net decrease in electric trackage has been less than 10 per cent. Mileage of extensions and also of abandonments decreased in 1929 as compared with 1928. Volume of track reconstruction continued large on both urban and interurban properties

Comparison of Track Construction by Years

Year	Track Extensions Number of Companies	Track Extensions Miles	Track Rebuilt Number of Companies	Track Rebuilt Miles	Electrified Steam Lines Miles
1908	157	1,174.5	(a)	(a)	84.00
1909	160	774.7	(a)	(a)	112.40
1910	217	1,204.8	(a)	(a)	192.40
1911	223	1,105.0	(a)	(a)	86.50
1912	171	869.4	(a)	(a)	80.80
1913	181	974.9	(a)	(a)	119.00
1914	163	716.5	(a)	(a)	229.00
1915	136	596.0	(a)	(a)	448.20
1916	104	356.30	(a)	(a)	388.00
1917	121	376.70	150	375.40	66.00
1918	80	313.82	81	155.43	275.70
1919	73	140.57	148	389.89	287.60
1920	87	176.56	131	361.77	8.92
1921	78	147.10	184	615.21	8.08
1922	104	211.38	212	739.70	12.35
1923	132	233.15	241	854.63	26.12
1924	112	312.08	218	764.33	83.39
1925	100	339.79	179	578.90	236.36
1926	95	317.96	...	802.52	169.52
1927	95	192.41	212	887.94	140.70
1928	103	238.94	216	894.73	276.14
1929	81	167.71	190	700.14	204.85

(a) Information not available.

MANY changes in physical plant have been made by the electric railways in recent years to meet the changing transportation requirements of the public. Although somewhat smaller in extent, the changes which occurred in 1929 were similar in character to those of other recent years. During the past decade a considerable amount of track has been abandoned where operation proved unprofitable. At the same time the electric railways have been active in adding to their trackage in profitable territory. The net result of these changes has been a decrease of about 9½ per cent in the total electrified track mileage in the United States and Canada. Undoubtedly the readjustment of trackage by abandonments in some localities and extensions in others has greatly strengthened the position of the industry.

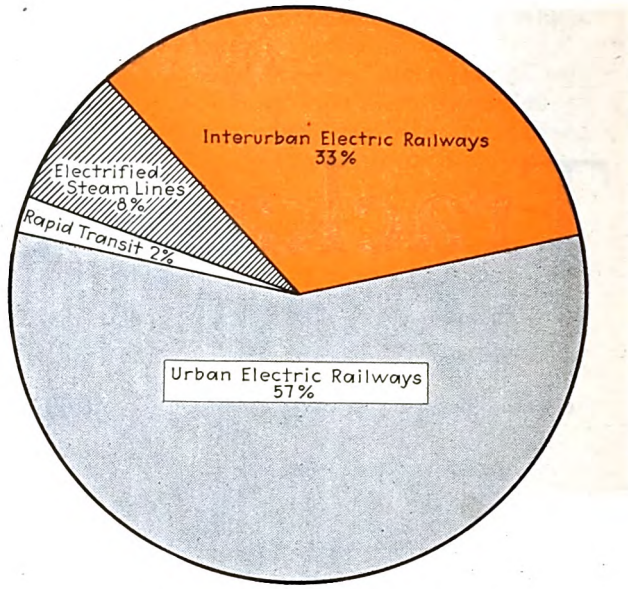
In all, approximately 1,050 miles of track was built or rebuilt in 1929. Extensions of electric trackage made during the year totaled nearly 380 miles. This total was divided almost equally between additions to the trackage of the local transportation systems and additions to the

Digitized by Google

electrified trackage of the steam railroads. Extensions made to rapid transit track mileage were relatively unimportant.

While the mileage of extensions made in 1929 was somewhat below that of the preceding year, it was slightly above the average for the past ten years. Since Jan. 1, 1920, the urban and interurban electric railways of the United States and Canada have added a total of 2,337.08 miles of track to their systems. Approximately 70 per cent of these extensions were made by the urban railways and 30 per cent by the interurbans. During the same period the steam railroads added 1,166.43 miles to their electrified trackage. Thus the total increase in electric railway track has been approximately 3,500 miles or an average of about 350 miles per year. The mileage of extensions is summarized by years in an accompanying table.

Some 80 electric railways made extensions to their trackage last year. Among the important additions reported by these companies are 16.48 miles built by the Department of Street Railways, Detroit, 11.52 miles by the Montreal Tramways, 10.94 miles by the Cleveland Railway, 10.45 miles by the Milwaukee Electric Railway & Light Company, 5.21 miles by the Pacific Electric Railway, 19.98 miles by the Sacramento Northern Railway, and 23.76 miles by the Oklahoma Railway. Numerous other extensions were made, ranging in length from a fraction of a mile to 5 miles. The complete list of extensions made in 1929 is tabulated below. A number of additions made to the electrified track mileage of the steam railroads are discussed in greater detail elsewhere in this issue.



Classification of electrified track mileage

Nearly 200 electric railways reported reconstruction of track during the year just ended. This is about the same number as in other recent years. In all, a total of more than 700 miles of track was rebuilt, of which approximately 475 miles was in paved street and 225 miles was open construction. The total figure for 1929 is slightly less than that for 1928, but about the same as the average for the past ten years. This decrease in

Track Extensions in 1929

Name of Company	Miles
Alabama	
Birmingham Elec. Co.	0.02
California	
Market St. Ry., San Francisco	0.30
Pacific Elec. Ry.	5.21
Peninsular Ry., San Jose	0.75
Sacramento Northern Ry.	19.98
Visalia Elec. R.R.	0.10
Connecticut	
Connecticut Company	1.80
Delaware	
Delaware Elec. Power Co.	0.29
Florida	
Miami Beach Ry.	0.48
Tampa Electric Co.	0.04
Illinois	
Calumet & South Chicago Ry.	0.14
Chicago, Aurora & Elgin R.R.	0.25
Chicago City Ry.	0.07
Chicago Rys.	0.23
Chicago, North Shore & Milwaukee R.R.	3.45
St. Louis & Belleville Elec. Ry.	0.41
Indiana	
Chicago, South Shore & South Bend R.R.	4.00
Indianapolis Street Ry.	0.19
Indiana Service Corp.	0.36
Lafayette Street Ry.	1.00
Union Traction Co.	0.25
Kentucky	
Louisville Ry.	1.13
Louisiana	
New Orleans Public Service Inc.	0.80
Maryland	
United Rys. & Elec. Co., Baltimore	4.45
Massachusetts	
Berkshire St. Ry.	0.21
Boston Elevated Ry.	2.60
Eastern Mass. Street Ry.	4.91
Worcester Consolidated St. Ry.	0.22
Michigan	
Dept. of Street Rys., Detroit	16.48
Eastern Michigan Ry.	1.50
Minnesota	
Duluth Street Ry.	0.59
Twin City Rapid Transit Co.	4.00
Missouri	
Kansas City Public Service Co.	1.14
St. Louis Public Service Co.	1.10
Nebraska	
Omaha & Council Bluffs Street Ry.	0.97
New York	
International Ry., Buffalo	0.45
New York, Westchester & Boston Ry.	2.92
Niagara Junction Ry.	0.60
Third Avenue Railway	0.13
Steinway Railway	0.04
North Dakota	
Northern States Pwr. Co., Fargo	0.14
Ohio	
Cincinnati Street Ry.	0.18
Community Traction Co.	0.21
Cleveland Ry.	10.94
Ohio Public Service Co.	0.11
Pennsylvania-Ohio Pwr. & Lt. Co.	0.27
Toledo Western Ry.	0.13
Oklahoma	
Oklahoma Railway	23.76
Oklahoma Union Ry.	0.82
Oregon	
Portland Electric Power Co.	2.00
Pennsylvania	
Conestoga Traction Co.	0.43
Harrisburg Rys.	0.28
Philadelphia Rapid Transit Co.	3.22
Pittsburgh Railways	2.91
York Railways	0.27
Rhode Island	
United Elec. Rys., Providence	0.27
Tennessee	
Memphis Street Ry.	0.0
Texas	
Dallas Ry. & Terminal Co.	0.28
Eastern Texas Elec. Co.	0.23
Houston North Shore Ry.	0.33
Texas Electric Ry.	1.50
Utah	
Salt Lake & Utah R.R.	1.65
Virginia	
Lynchburg Traction & Light Co.	0.35
Virginia Public Service Co.	0.10
Washington	
Seattle Municipal Street Ry.	0.42
Spokane, Coeur d'Alene & Palouse Rys.	0.12
Tacoma Ry. & Power Co.	0.17
Yakima Valley Transportation Co.	0.06
West Virginia	
Monongahela West Penn. Pub. Serv. Co.	0.08
Wisconsin	
Milwaukee Elec. Ry. & Light Co.	10.45
Wisconsin Gas & Elec. Co.	0.38
Canada	
British Columbia Elec. Ry.	0.30
Cornwall Street Ry. Light & Power Co.	0.50
Hamilton Street Ry.	4.00
Montreal Tramways	11.52
Niagara, St. Catherines & Toronto Ry.	0.20
Nova Scotia Light & Power Co.	0.17
Oshawa Ry.	0.48
Saskatoon Municipal Ry.	1.20
Sherbrooke Elec. Ry. & Power Co.	0.11
Winnipeg Elec. Co.	3.27
Total	167.71

Digitized by Google

the volume of track reconstruction done last year as compared with the preceding year was to be expected, however, as the budget figures published in the Jan. 12, 1929, statistical issue of ELECTRIC RAILWAY JOURNAL showed a slight reduction in the expenditures planned for way and structures in 1929 as compared with 1928. Indications from similar reports received during the past few weeks are that the volume of trackwork which will be done during the coming year will show a considerable increase.

The largest single program of track reconstruction reported for the year 1929 was that of the Department of Street Railways, Detroit, which rebuilt more than 42 miles of track. Next in size were the programs of the Pittsburgh Railways, Public Service Co-ordinated Transport and the Philadelphia Rapid Transit Company which rebuilt about 32, 26 and 25 miles of track, respectively. Other urban railways reporting more than 10 miles of reconstruction during the past year include the Connecticut Company, Chicago Surface Lines, Twin

Track Reconstruction in 1929

Name of Company	Miles Paved	Miles Open
Alabama		
Alabama Power Co., Anniston	....	0.76
Alabama Power Co., Montgomery	0.45	....
Alabama Power Co., Tuscaloosa	0.15	....
Birmingham Elec. Co.	2.32	6.45
Birmingham & Edgewood Elec. Ry.	....	0.32
Mobile Light & R.R. Co.	3.53	7.21
Arkansas		
Texarkanna Street Railway	....	0.20
California		
Key System Transit Co	2.18	....
Los Angeles Ry.	17.53	....
Market St. Ry., San Francisco	2.22	....
Municipal Ry. of San Francisco	0.77	....
Pacific Elec. Ry.	3.36	11.41
Southern Pacific Co., East Bay Div.	5.84	4.62
Colorado		
Denver & Intermountain R.R.	....	0.04
Denver Tramway	2.60	1.23
Connecticut		
Connecticut Co.	10.90	1.02
Delaware		
Delaware Elec. Power Co.	0.65	....
District of Columbia		
Capital Traction Co.	1.63	....
Washington Ry. & Elec. Co.	4.07	....
Florida		
Gulf Power Co., Pensacola	0.11	0.06
Jacksonville Traction Co.	....	1.71
Tampa Electric Co.	1.00	....
Georgia		
Georgia Power Co., Atlanta	6.14	....
Illinois		
Calumet & South Chicago Ry.	0.86	....
Chicago, Aurora & Elgin R.R.	....	12.00
Chicago City Ry.	9.11	....
Chicago Rys.	14.32	0.25
Chicago & Joliet Elec. Ry.	1.00	....
Chicago, No. Shore & Milwaukee R.R.	1.28	3.03
East St. Louis Ry.	0.50	....
Illinois Power & Light Corp., Champaign	....	0.04
Illinois Power & Light Corp., Decatur	0.15	....
Illinois Power & Light Corp., Peoria	1.60	....
Rockford Elec. Co.	0.35	....
St. Louis & Alton Ry.	....	1.93
St. Louis & Belleville Elec. Ry.	....	0.41
Indiana		
Beech Grove Traction Corp.	....	1.00
Chicago, S. Bend & Northern Ind. Ry.	1.25	....
Chicago, S. Shore & S. Bend R.R.	....	7.00
Indianapolis St. Ry.	1.47	1.18
Indiana Service Corp.	....	0.55
Lafayette Street Railway	1.00	....
Terre Haute, Ind. & Eastern Trac. Co.	0.19	....
Union Traction Co.	0.05	....
Kansas		
Kansas Power & Light Co.	0.76	....
Wichita R.R. & Light Co.	0.50	....
Kentucky		
Louisville Ry.	2.09	0.88
Louisville & Interurban Ry.	0.11	....
Louisiana		
New Orleans Public Service, Inc.	3.58	3.33
Maine		
Biddeford & Saco R.R.	....	1.50
York Utilities Co.	0.90	0.90
Maryland		
Potomac Edison Co.	0.38	....
United Rys. & Elec. Co., Baltimore	7.63	1.33
Massachusetts		
Berkshire St. Ry.	0.05	1.57
Boston Elevated Ry.	5.02	2.76
Boston, Revere Beach & Lynn R.R.	....	4.00
Boston, Worcester & New York St. Ry.	....	15.00
Eastern Mass. St. Ry.	8.41	1.25
Springfield St. Ry.	2.34	2.28
Union Street Ry., New Bedford	1.00	3.00
Worcester Consolidated St. Ry.	2.22	0.34
Michigan		
Eastern Michigan-Toledo R.R.	0.10	....
Eastern Michigan Railway	2.10	....
Dept. of Street Railways, Detroit	40.22	2.05
Minnesota		
Duluth St. Ry.	3.11	....
Northern States Pwr. Co., St. Cloud	....	1.00
Twin City Rapid Transit Co.	13.80	....
Missouri		
Hannibal Ry. & Elec. Co.	0.19	....
Kansas City Public Service Co.	0.49	....
Springfield Traction Co.	1.27	....
St. Joseph Ry., Lt., Ht. & Pwr. Co.	0.50	....
St. Louis Public Service Co.	7.00	0.32
Montana		
Butte Elec. Ry.	0.40	....
Nebraska		
Lincoln Traction Co.	0.41	....
Omaha & Council Bluffs St. Ry.	0.88	0.08
Omaha Lincoln & Beatrice Ry.	0.25	....
New Hampshire		
Berlin Street Railway	....	0.38
Nashua Street Railway	0.33	....
New Jersey		
Public Service Co-ord. Transport	23.85	2.11
New York		
International Ry., Buffalo	10.51	0.54
Jamaica Central Rys.	1.35	....
Jamestown Street Railway	1.23	....
Manhattan & Queens Trac. Corp.	0.28	4.83
New York Rys.	0.68	....
New York & Queens County Ry.	1.26	3.63
New York State Rys., Rochester	1.91	3.10
New York State Rys., Syracuse	....	1.96
New York State Rys., Utica	0.61	....
Schenectady Ry.	1.25	....
Steinway Ry.	1.61	....
Syracuse & Eastern R.R.	0.58	....
Triple Cities Traction Co., Binghamton	0.47	1.70
Third Ave. Ry.	12.16	....
United Traction Co., Albany	1.79	....
North Carolina		
Carolina Pwr. & Lt. Co., Raleigh	....	0.25
Tide Water Power Co., Wilmington	....	0.13
North Dakota		
Northern States Pwr. Co., Fargo	0.48	....
Ohio		
Cincinnati, Hamilton & Dayton Ry.	0.56	0.28
Cincinnati, Newport & Covington, Ry.	3.70	....
Cincinnati St. Ry.	15.00	1.62
Cleveland Ry.	8.35	0.71
Cleveland Southwestern Ry. & Lt. Co.	0.50	....
Columbus Ry., Pwr. & Lt. Co.	1.49	....
Columbus, Delaware & Marion Elec. Co.	1.00	....
Community Traction Co., Toledo	8.12	0.70
Indiana, Columbus & Eastern Trac. Co.	....	19.90
Lake Shore Elec. Ry.	1.85	2.00
Lima & Toledo R.R.	0.28	13.10
Lorain St. Railroad	0.34	....
Lancaster Traction & Power Co.	1.00	....
Northern Ohio Pwr. & Lt. Co.	3.55	....
Pennsylvania-Ohio Pwr. & Lt. Co.	0.34	....
Shenango Valley Trac. Co.	0.32	....
Stark Electric R.R.	0.56	....
Toledo & Western Ry.	0.38	1.50
Toledo, Fostoria & Findlay Ry.	0.50	....
Western Ohio Ry. & Power Corp.	0.40	....
West End Trac. Co.	....	0.72
Oklahoma		
United Service Co., Tulsa	2.00	....
Oregon		
Portland Electric Power Co.	....	1.25
Pennsylvania		
Allegheny Valley Street Railway	0.10	3.30
Altoona & Logan Valley Elec. Ry.	0.70	2.17
Beaver Valley Traction Co.	1.58	....
Conestoga Traction Co.	0.20	....
Erie Rys.	1.00	....
Harrisburg Rys.	0.97	0.25
Johnstown Traction Co.	2.00	....
New Castle Elec. St. Ry.	0.50	....
Northern Ohio Power & Light Co.	3.55	....
Philadephia Rapid Transit Co.	24.69	0.64
Pittsburgh Railways	27.85	4.66
Pittsburgh, Harmony, Butler & New Castle Ry.	1.00	15.00
Reading Transit Co.	1.75	....
Scranton Ry.	1.44	0.15
Southern Pennsylvania Traction Co.	0.55	....
Valley Rys., Lemoyne	0.63	0.62
Webster, Monessen, Belle Vernon, Fayette City St. Ry.	0.31	....
West Penn. Rys.	1.20	0.90
Wilkes-Barre Ry.	1.10	0.63
Williamsport Rys.	0.13	....
York Railways	1.09	....
Rhode Island		
United Elec. Rys., Providence	7.50	....
Tennessee		
Knoxville Power & Light Co.	0.21	....
Memphis St. Ry.	8.10	....
Nashville Ry. & Lt. Co.	1.45	1.55
Tennessee Electric Power Co.	3.12	....
Texas		
Dallas Ry. & Terminal Co.	1.28	0.50
Galveston Elec. Co.	0.59	....
Houston Elec. Co.	0.02	0.81
San Antonio Public Service Co.	0.71	3.12
Texas Elec. Ry.	1.00	1.00
Utah		
Salt Lake & Utah R.R.	....	0.75
Utah Light & Traction Co.	0.20	....
Virginia		
Lynchburg Trac. & Lt. Co.	2.00	....
Roanoke Ry. & Elec. Co.	0.65	1.28
Virginia Elec. & Pwr. Co.	6.15	1.66
Virginia Public Service Co.	0.19	....
Washington		
Gray's Harbor Ry. & Lt. Co.	0.71	....
Seattle Municipal St. Ry.	2.70	3.06
Spokane United Rys.	0.77	5.00
Tacoma Ry. & Pwr. Co.	2.92	2.87
West Virginia		
Charleston Interurban R.R.	0.25	....
Monongahela West Penn Pub. Serv. Co.	0.32	0.16
Wheeling Traction Company	3.00	1.30
Wisconsin		
Chicago & Milwaukee Elec. Ry.	1.28	....
Madison Rys.	0.50	....
Milwaukee Elec. Ry. & Lt. Co.	10.52	4.58
Northern States Power Co., Eau Claire	1.00	2.30
Wisconsin Power & Lt. Co.	0.75	....
Wisconsin Valley Elec. Co.	0.70	....
Hawaiian Islands		
Honolulu Rapid Transit Co.	0.63	....
Canada		
British Columbia Elec. Ry.	2.17	1.55
Cape Breton Electric Co.	0.75	....
Cornwall St. Ry. Lt. & Power Co.	0.50	....
Edmonton Radial Ry.	0.86	....
Hamilton St. Ry.	2.00	....
Hydro-Electric Rys., Guelph	....	0.50
Hydro Electric Rys., Kingsville	1.00	....
Hydro-Electric Rys., Windsor	1.10	....
Lethbridge Municipal St. Ry.	....	1.00
Levis Tramways	1.50	....
London Street Ry.	0.88	....
Montreal Tramways	10.37	0.25
New Brunswick Power Co.	0.53	0.38
Nova Scotia Light & Power Co.	0.64	1.26
Ottawa Electric Railway	3.00	....
Saskatoon Municipal Ry.	1.00	....
Sherbrooke Elec. Ry. & Power Co.	0.60	0.45
Toronto Transportation Commission	5.04	....
Winnipeg Elec. Co.	1.32	....
Totals	**472.07**	**228.07**

Digitized by Google

City Rapid Transit Company, Mobile Light & Railroad Company, International Railway at Buffalo, Cincinnati Street Railway, Milwaukee Electric Railway & Light Company, Los Angeles Railway, Third Avenue Railway and the Montreal Tramways. Among the interurbans, the Pacific Electric Railway, the Pittsburgh, Harmony, Butler & New Castle, the Boston, Worcester & New York Street Railway, the Indiana, Columbus & Eastern Traction Company, the Lima & Toledo Railroad and the Chicago, Aurora & Elgin Railroad reported more than 10 miles of reconstruction done during the past year.

Less track was permanently abandoned by the electric railways during 1929 than in other recent years. In all, about 750 miles of track was abandoned by companies which continued to operate the major portions of their rail systems. Reasons for such abandonments were the same as those which have actuated similar actions in the past—light traffic which did not produce sufficient revenue to meet operating costs or the necessity to make large expenditures for rehabilitation, or both. In many instances bus operation under the management of the railway was inaugurated to replace the rail service formerly given. In some instances, however, where traffic was extremely thin, it was not deemed advisable to supply service of any kind.

The number of electric railways which abandoned all rail operation was smaller in 1929 than in any other recent year, as was also the mileage involved. Altogether, there were fewer than twenty such companies operating only about 300 miles of track. Among these the West Chester Street Railway, the Burlington Traction Company, the Sioux Falls Traction System and the Hamilton Radial Electric Railway, all replaced their rail service by bus service under their own auspices. The Bethlehem Transit Company abandoned rail operation, and bus service is now furnished by the Lehigh Valley Transit Company. All rail operations were abandoned in the small cities of Plattsburgh, N. Y., and Santa Barbara, Cal., without the substitution of any other organized transportation service. Other complete abandonments of the year include the Manhattan Bridge 3-Cent Line of New York City and the Van Brunt & Erie Basin Railroad in Brooklyn. Prior to their abandonment the service rendered by these companies had been superseded to a large extent by under-river tunnels and rapid transit service.

Analysis of the conditions surrounding the abandonment of some 150 electric railway systems during the past decade shows that the great majority have occurred in small communities. The average size of the population served was approximately 10,000 and the average length of the rail system was about 8.5 miles. Nearly half of

Partial Track Abandonments in 1929

Name of Campauy	Miles
Alabama	
Birmingham Elec. Co.	0.14
Arizona	
Street Ry., City of Phoenix	5.50
Tucson Rapid Transit Co.	1.01
Arkansas	
Arkansas Pwr. & Lt. Co., Pine Bluff	0.20
California	
Key System Transit Co.	9.32
Market St. Ry., San Francisco	0.10
Pacific Coast Ry., San Luis Obispo	0.44
Pacific Elec. Ry.	10.54
Peninsular Ry., San Jose	2.00
Sacramento Northern Ry.	0.13
San Diego Elec. Ry.	1.30
Colorado	
Denver Tramway	11.76
Connecticut	
Connecticut Co.	42.49
New Haven & Shore Line Elec. Ry.	18.13
Delaware	
Delaware Elec. Power Co.	11.76
District of Columbia	
Washington Ry. & Elec. Co.	0.05
Florida	
Gulf Power Co., Pensacola	1.81
Jacksonville Trac. Co.	1.26
Georgia	
Columbus Elec. & Pwr. Co.	0.90
Georgia Power Co., Rome	1.60
Savannah Electric & Power Co.	2.51
Illinois	
Alton Ry.	4.18
Chicago & Illinois Valley R.R.	14.39
Chicago & Joliet Elec. Ry.	1.00
Illinois Power & Light Corp., Bloomington	0.98
Illinois Power & Light Corp., Galesburg	1.50
Illinois Power & Light Corp., Quincy	15.94
Rockford, Beloit & Janesville Elec. Ry.	10.00
Indiana	
Indiana, Columbus & Eastern Traction Co.	8.37
Interstate Public Service Co.	2.16
Northern Indiana Power Co.	0.25
Union Traction Co.	0.65
Iowa	
Mississippi Valley Elec. Co., Iowa City	1.00
Omaha & Council Bluffs Ry. & Bridge Co.	0.77
Tri-City Ry. of Iowa	1.74

Name of Company	Miles
Kansas	
Kansas Power & Light Co., Topeka	8.24
Kentucky	
Kentucky Utilities Co., Paducah	2.20
Louisville Ry.	0.28
Louisiana	
New Orleans Public Service, Inc.	13.76
Orleans-Kenner Trac. Co.	3.61
Maine	
Androscoggin & Kennebec Ry.	16.22
York Utilities Co.	32.68
Maryland	
Potomac Edison Co.	10.09
United Rys. & Elec. Co., Baltimore	6.33
Massachusetts	
Berkshire St. Ry.	2.73
Boston El. Ry.	19.54
Eastern Mass. St. Ry.	16.81
Fitchburg & Leominster St. Ry.	5.00
Massachusetts Northeastern St. Ry.	18.17
Middlesex & Boston St. Ry.	22.77
Worcester Consolidated St. Ry.	17.40
Michigan	
Dept. of Street Rys., Detroit	2.07
Lake Superior Dist. Pwr. Co., Ironwood	5.54
Minnesota	
Duluth St. Ry.	0.31
Twin City Rapid Transit Co.	0.26
Missouri	
City Light & Traction Co., Sedalia	0.45
Kansas City Public Service Co.	0.14
St. Louis Public Service Co.	4.26
Nebraska	
Omaha & Council Bluffs St. Ry.	0.19
New Jersey	
Coast Cities Railway	13.32
New York	
Fonda, Johnstown & Gloversville R.R.	4.05
International Ry, Buffalo	4.57
New York Rys.	0.15
New York State Rys., Oneida	1.71
New York State Rys., Rochester	44.86
New York State Rys., Utica	1.42
Niagara Junction Ry.	0.25
Ogdensburg St. Ry.	1.70
Steinway Railway	0.05
Third Avenue Ry.	20.04
United Traction Co., Albany	4.19
Ohio	
Cincinnati St. Ry.	1.60
Cleveland Ry.	6.15
Columbus Ry., Pwr. & Lt. Co.	3.47

Name of Company	Miles
Community Traction Co., Toledo	7.29
New Castle & Lowell Ry.	0.26
Northern Ohio Power & Light Co.	65.04
Ohio River Ry. & Pwr. Co.	9.29
Pioneer Transportation, Inc.	1.75
Youngstown Municipal Ry.	4.84
Oklahoma	
Northeast Oklahoma R.R.	0.60
Oklahoma Union Ry.	13.51
Pennsylvania	
Beaver Valley Traction Co.	0.06
Conestoga Traction Co.	0.17
Harrisburg Rys.	0.31
New Castle Elec. St. Ry.	0.32
Philadelphia Rapid Transit Co.	2.15
Pittsburgh Railways	2.17
Reading Transit Co.	0.25
Scranton Ry.	0.72
Valley Rys., Lemoyne	0.25
Rhode Island	
United Elec. Rys., Providence	44.90
Texas	
Eastern Texas Elec. Co.	0.68
Northern Texas Traction Co.	3.70
San Antonio Public Service Co.	2.57
Utah	
Utah Light & Traction Co.	5.71
Virginia	
Lynchburg Trac. & Lt. Co.	0.25
Petersburg, Hopewell & City Point Ry.	3.00
Roanoke Ry. & Elec. Co.	1.05
Virginia Elec. & Pwr. Co.	7.38
Virginia Public Service Co.	0.07
Washington	
Pacific Northwest Traction Co.	0.94
Seattle Municipal St. Ry.	6.12
Spokane, Coeur d'Alene & Palouse Rys.	0.40
Tacoma Ry. & Power Co.	20.66
Yakima Valley Transportation Co.	9.04
West Virginia	
Monongahela West Penn. Pub. Serv. Co.	22.28
Wisconsin	
Milwaukee Elec. Ry. & Lt. Co.	10.98
Wisconsin Public Service Corp.	21.22
Canada	
London Street Ry.	1.25
Montreal Tramways	0.90
Niagara, St. Catherines & Toronto Ry.	0.10
Oshawa Ry.	0.02
Winnipeg Elec. Co.	9.79
Total	766.45

Digitized by Google

these companies and half of the total miles of track were in towns having an average population of less than 5,000 persons. Only 10 per cent of the abandoned railways were located in towns of over 20,000 population.

A considerable number of other abandoned electric railway systems were so located that exact determination of the population served is impossible. From the fact that in many instances no organized transportation service has replaced the abandoned rail service, however, it may be inferred that the population formerly served by these lines also was exceedingly small.

Bus service has replaced rail service over about two-thirds of the abandoned mileage. In many instances this is being given by the same management which formerly gave rail service, but in some instances new management has come in. On some 1,300 miles of track where the traffic was so light that it became necessary to discontinue rail service, no organized transportation service of any kind is now given.

Entire Electric Railway Properties Abandoned in 1929

Name of Company	Miles of Track
Atlantic City & Suburban Ry.	16.00
Augusta-Aiken Railway	25.10
Bethlehem Transit Co.	7.25
*Burlington Rapid Transit Co.	16.50
Commission of Public Docks, Portland, Ore.	1.50
Detroit, Jackson & Chicago Ry.	69.14
*Hamilton Radial Elec. Ry.	18.00
Lima & Defiance R.R., Ohio	45.00
Lowell & Fitchburg St. Ry.	13.22
Manhattan Bridge 3c. Line	4.50
Plattsburgh Traction Co.	7.58
Puget Sound Power & Light Co., Southern District	6.66
Santa Barbara & Suburban Ry.	8.99
*Sioux Falls Traction System	14.50
*Vermont Co.	12.02
Van Brunt Street & Erie Basin R.R.	2.78
Warren & Jamestown St. Ry.	20.38
*West Chester Street Railway	28.00
Total	317.12

* Bus service substituted under same management.

Rapid Transit Situation Shows Little Change

New York, Boston, Philadelphia and Chicago are the only ones in which regular high-speed subway and elevated service is given

NOTWITHSTANDING widespread interest in transit in many cities, there are only four metropolitan centers in the United States where lines devoted exclusively to rapid transit passenger movement has been constructed. These are New York, Boston, Philadelphia and Chicago. The accompanying table gives the route and track mileages and the number of cars operated, as compiled from available sources.

New York, on account of the immense concentration of population in a limited area, naturally has the greatest rapid transit mileage. Two separate companies give both subway and elevated service in the boroughs of Manhattan, Brooklyn and Queens. The Interborough system alone operates in the Bronx, and the Staten Island Rapid Transit Company, which is an electrification of the steam railroad which has been in operation for many years, serves the Borough of Richmond (Staten Island). Besides these lines, the Hudson & Manhattan Railroad, popularly known as the Hudson Tubes, operates an underground system beneath Sixth Avenue, Manhattan, which crosses the Hudson River to reach points in Jersey City and Hoboken. A second route runs from the Hudson Terminal at Church and Dey Streets, Manhattan, to Jersey City and continues on surface tracks of the Pennsylvania Railroad to Newark. While the Hudson & Manhattan is an interstate line, and as such comes under the supervision of the Interstate Commerce Commission, its service differs but little from rapid transit.

For years the Long Island Railroad has been serving the urban population of New York City with suburban transit. It operates into the heart of Manhattan and supplements to a large extent the subway and elevated lines. The same is true to a lesser extent of the suburban services of the New York Central, New York, New Haven & Hartford, and New York, Westchester & Boston.

In Boston the rapid transit service is given by the trains of the Boston Elevated Railway. In addition there are several routes of surface cars operating on elevated or subway tracks. The most important of these is the Boylston Street subway, which runs from Kenmore to Park Street at the edge of the Boston Common. Another route runs on an elevated track from Lechmere Square to North Station, the surface cars continuing into the Tremont Street Subway to Park Street.

The Boston, Revere Beach & Lynn Railroad is a narrow-gage line operating on its own right-of-way between East Boston and Lynn, Mass. Its method of operation differs but little from the rapid transit lines of the Boston Elevated Railway, and for that reason it is included.

Data on Rapid Transit Lines in United States

	Route Miles — Subway	Route Miles — Elevated	Total Track Miles	Cars
Chicago, Ill.				
Chicago Rapid Transit Co.	0.0	81.1	229.5	1,797
Boston, Mass.				
Boston Elevated Railway	12.2	10.0	57.5	528
Boston, Revere Beach & Lynn R.R.	0.0	13.8*	31.0	96
New York, N. Y.				
Brooklyn-Manhattan Transit Co.	41.66	.....	280.6	1,939
Interborough Rapid Transit Co.	44.6	116.6	356.7	3,712
Hudson & Manhattan R.R.	8.5	0.0†	20.0	305
Staten Island Rapid Transit Co.	0.0	21.6*	44.7	100
Philadelphia, Pa.				
Philadelphia Rapid Transit Co.				
Market St.-Frankford Elevated	2.6	11.8	39.0	215
Broad St. Subway	6.1	0.0	20.9	150

*Operates a high-speed line on the surface on private right-of-way.
†Operates a subway line and leases a high-speed surface line on the private right-of-way of the Pennsylvania Railroad to Newark, N. J.

Besides these lines there are several instances where electric railways and electrified steam lines give service comparable with that already described. The Northwestern Pacific Railroad, and the Key System Transit Company, operating across the bay from San Francisco, are examples of this class of service. The Illinois Central Railroad runs a suburban service in the city of Chicago and its suburbs that is comparable to rapid transit. Beginning in the near future certain lines centering in the Cleveland Union Terminal will furnish suburban service, principally within the city of Cleveland, differing but little from rapid transit.

In the city of Cincinnati a rapid transit subway has been constructed, but the stations never have been built nor track laid. For that reason it is impossible to include it in the tabulation.

Digitized by Google

Bus Operations *Are Steadily*

By

J. R. STAUFFER

Assistant Editor *Electrical Railway Journal*

CONTINUED activities in the co-ordination of bus and trolley operations, substitution of buses for cars on small, unprofitable lines that did not warrant rehabilitation, and the merging of numerous independent units into stronger unified systems were the dominant features in the development of bus operations by electric railways in 1929.

These adjustments involved the purchase of nearly 2,200 buses during the past year and the extension and installation of bus routes of approximately 4,000 miles, bringing the total number of buses now operated by the electric railways of the United States and Canada to 12,451 and the total number of bus-miles covered to 24,937. In comparison with the 1928 survey, purchases of bus equipment were slightly lower in 1929, but extensions to bus mileage were greater, excluding the mileage added in 1928 by the Southern Pacific Motor Transport Company in special long-haul service.

Bus Operation by Electric Railways and Subsidiary Companies

	No. Buses Jan. 1, 1930
Alabama	
Alabama Power Co. { Gadsden	4
Alabama Power Co. { Sheffield	2
Birmingham Electric Co	4
*Selma Electric Ry	5
Arizona	
Phoenix Street Ry	2
Tucson Rapid Transit Co	5
*Warren Co	6
Arkansas	
Arkansas Power & Light Co	11
Intercity Terminal Railway	9
California	
Bakersfield & Kern Electric Ry	5
Eureka Street Ry	1
Key System Transit Co	64
Los Angeles Ry	189
Los Angeles Motor Bus Co.	67
Market Street Ry	6
Municipal Ry. of San Francisco	18
Pacific Electric Ry	132
Pacific Gas & Electric Co	11
Peninsular Ry	8
Sacramento Northern Ry	1
San Diego Electric Ry	30
San Francisco, Napa & Calistoga R.R.	2
Napa Valley Bus Co.	
San Jose Railroads	1
Southern Pacific Co. (Electric Division)	52
*Union Traction Co., Santa Cruz	5
Colorado	
Colorado Springs & Interurban Ry	5
*Denver & Interurban Motor Co	10
*Denver & South Platte Transportation Co.	2
Denver Tramway	22
Bus Transportation Co.	
Fitzsimons Bus & Taxi Co.	
Grand River Valley Ry	2
Public Service Co. of Colo	5
Connecticut	
Connecticut Co	165
*Danbury Power & Transportation Co	17
*Groton & Stonington Traction Co	14
*Lordship Ry	5
New Haven & Shore Line Ry	13
Waterbury & Mildale Tramway	3
Delaware	
Delaware Electric Power Co	22
Delaware Bus Co.	
District of Columbia	
Capital Traction Co	42
Washington Ry. & Electric Co	101
Washington & Old Dominion Ry	1
Florida	
Jacksonville Traction Co	4
*Key West Electric Co	5
Miami Beach Ry	50
Municipal Ry. of St. Petersburg	8
Tampa Electric Co	23

	No. Buses Jan. 1, 1930
Georgia	
Columbus Electric & Power Co	22
Columbus Transportation Co.	
Georgia Power Co	29
Atlanta Coach Co.	
Savannah Electric & Power Co	18
Idaho	
*Boise Street Car Co	11
Illinois	
Alton Ry	5
Aurora, Elgin & Fox River Electric Co	5
*Central Illinois Public Service Co. { Charleston	2
*Central Illinois Public Service Co. { Springfield	9
*Central Illinois Traction Co	3
Chicago, Aurora & Elgin R.R.	10
Western Motor Coach Co.	
Chicago City Ry	3
Chicago & Illinois Valley R.R.	10
Chicago & Joliet Electric Ry	10
Chicago & Joliet Transportation Co.	
Chicago, North Shore & Milwaukee R.R.	85
Metropolitan Motor Coach Co.	
Chicago Ry	5
Chicago & West Towns Ry	46
East St. Louis & Suburban Ry	5
East St. Louis Ry	13
Evanston Ry	27
Evanston & Niles Center Bus Co.	
Illinois Power Co	19
Illinois Power & Light Corp	139
Illinois Terminal R.R.	18
*Joliet, Plainfield & Aurora Transp. Co	6
Kewanee Public Service Co	2
Rockford Electric Co	26
Rockford & Interurban Ry	10
Tri-City Ry. of Ill	5
Indiana	
Beech Grove Traction Corp	8
Chicago, South Bend & Northern Indiana Ry.	25
Chicago, South Shore & South Bend R.R.	108
Shore Line Motor Coach Co.	
Evansville & Ohio Valley Ry	10
Gary Railways	5
Indianapolis, Columbus & Southern Trac. Co.	2
Indianapolis Street Ry	27
Peoples Motor Coach Co.	
Indianapolis & Southeastern R.R.	8
Indiana Service Corp	12
Interstate Public Service Co	32
Northern Indiana Power Co	5
Southern Indiana Gas & Electric Co	17
Southern Michigan Ry	3
Terre Haute, Indianapolis & Eastern Trac. Co.	50
Indiana Motor Transit Co.	
T. H. I. & E. (Terre Haute Div.)	19
Union Traction Co. of Indiana	51
Iowa	
Cedar Rapids & Iowa City R.R.	8
Clinton, Davenport & Muscatine Ry	3
Des Moines & Central Iowa R.R.	3
*Des Moines Electric Light Co	6
Fort Dodge, Des Moines & Southern R.R.	37
Ft. Dodge, Des Moines & South. Transp. Co.	

	No. Buses Jan. 1, 1930
Fort Madison Street Ry	2
Interstate Power Co	9
*Iowa Railway & Light Co., Marshalltown	9
Iowa Southern Utilities Co.	
Burlington	22
Centerville	3
Ottumwa	6
Mississippi Valley Electric Co	5
Waterloo, Cedar Falls & Northern Ry	11
Tri-City Ry	15
Kansas	
Arkansas Valley Interurban Ry	12
Arkansas Valley Transportation Co.	
Kansas City, Leavenworth & Western Ry.	13
Leavenworth Transportation Co.	
Kansas Power & Light Co	39
Kansas Public Service Co	2
Salina Street Ry	2
United Power & Light Corp	3
Wichita Railroad & Light Co	50
Wichita Motor Bus Co.	
Kentucky	
Kentucky Traction & Terminal Co	29
Kentucky Coach Co.	
Consolidated Coach Corp.	
Kentucky Utilities Co	12
Louisville Ry	43
Kentucky Carriers, Inc.	
Louisiana	
Baton Rouge Electric Co	3
*Louisiana Elec. Co	7
Municipal Street Ry., Alexandria	12
New Orleans Public Service, Inc	39
Maine	
York Utilities Co	5
Maryland	
*Cumberland & Westernport Transit Co	13
Potomac Edison Co	93
Blue Ridge Transportation Co.	
United Rys. & Electric Co	122
Baltimore Coach Co.	
Washington, Baltimore & Annapolis Elec. R.R.	3
Massachusetts	
Berkshire Street Ry	4
Boston Elevated Ry	319
Boston, Revere Beach & Lynn Ry	2
Point Shirley St. Ry. Co.	
Boston, Worcester & New York Street Ry.	11
Eastern Massachusetts Street Ry	90
East Taunton Street Ry	2
Fitchburg & Leominster Street Ry	7
*Gardner-Templeton Street Ry	9
Holyoke Street Ry	3
Interstate Street Ry	14
Middlesex & Boston Street Ry	98
*Milford, Framingham, Hopedale & Uxbridge Coach Co	7
Northampton Street Ry	4

(*Table Continued on page 22*)

Digitized by Google

Expanded by Electric Railways

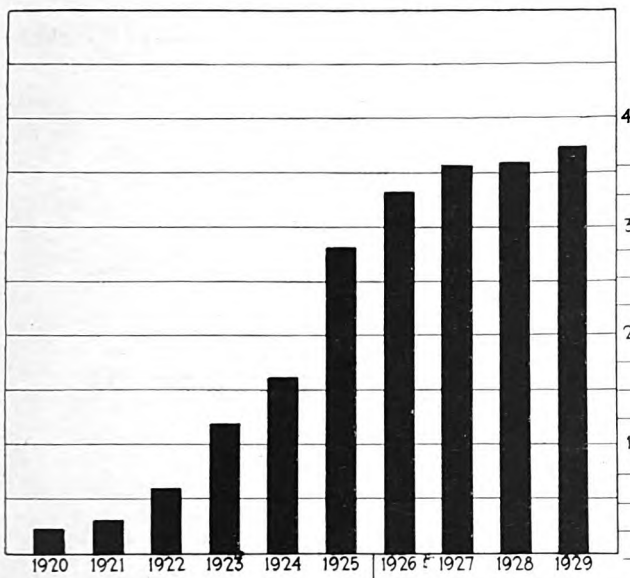
Purchases of new buses and extensions of bus mileage during the past year denote normal and healthy progress. Almost 2,200 buses were bought and nearly 4,000 miles of route was added

Of the 2,194 buses bought last year, 1,813 were new equipment while 381 were used and were acquired, in most cases, in the absorption of independent bus companies by the railways. Similarly, the figure of 775 buses which were sold or scrapped during the year includes a large number of transferred equipment as a result of the merging of interests.

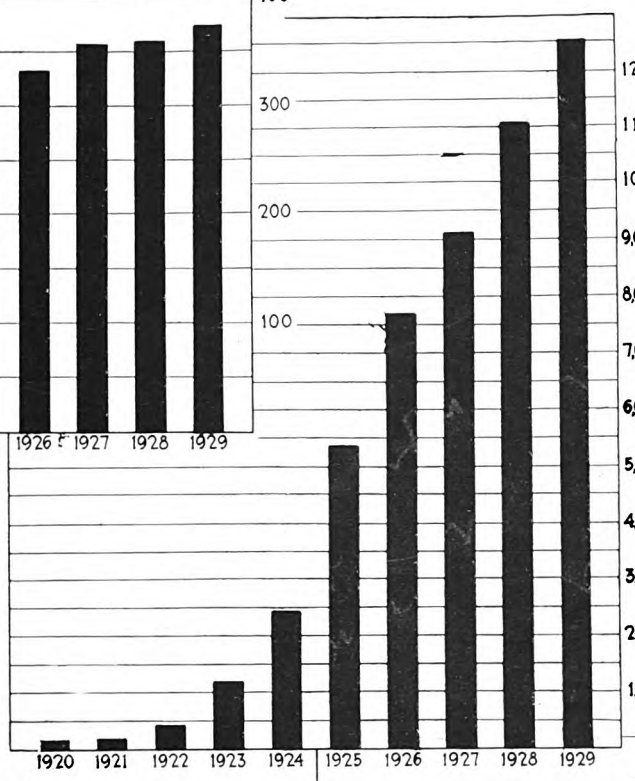
Still maintaining its position as the largest operator of motor buses in the United States, Public Service Co-ordinated Transport, of New Jersey, increased its fleet to a total of 2,337 buses. During 1929 this company purchased 638 buses, of which 374 were new and 264 were second-hand. Practically all of these buses were of the semi-deluxe or deluxe, 29 to 33-passenger type. Approximately 1,100 miles of bus routes was added to the existing routes, bringing the total to 2,852 miles.

Other large purchasers of bus equipment were: United Electric Railways, Providence, R. I., which bought 72 new buses from 29 to 37-passenger capacity; Toronto Transportation Commission, which added 51 buses ranging in seating capacity from 17 to 33 passengers; New York State Railways, which purchased 50 buses of the 30 to 38-passenger type; Northern Ohio Power & Light, which bought 46 buses of large seating capacity and the Manila Electric Company, which more than doubled its fleet, adding 46 new small type buses to the 36 it already owned. The Boston Elevated Railway, Detroit Street Railways, Cleveland Railway, Virginia Electric & Power Company and the Third Avenue Railway in New York each purchased more than 25 new buses during 1929.

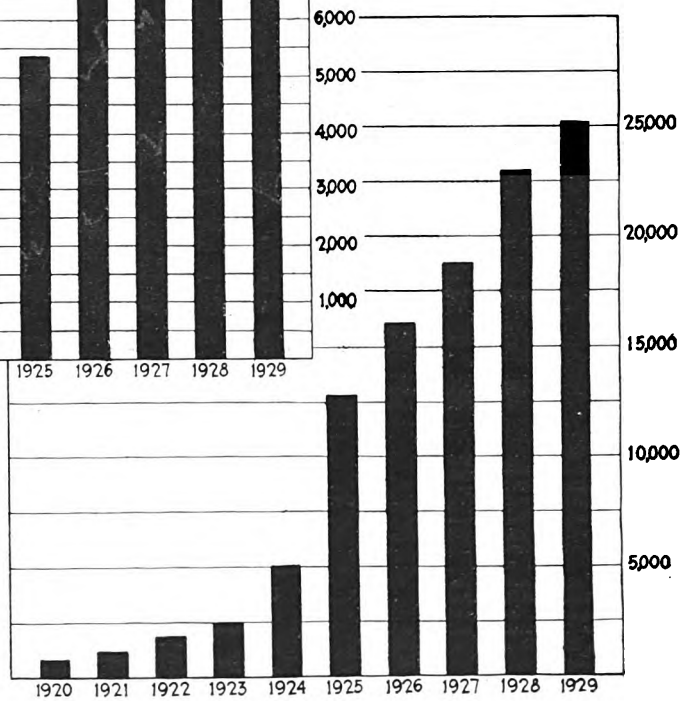
Bus mileage changes during the year include 3,825 miles of extensions and 670 miles of abandoned route. Of the extensions made, only 425 miles replaced former trolley operations, and in almost every case substitution of bus service was made on lines which were due for renewal of tracks or subject to municipal paving demands. The Wheeling Traction Company, through its acquisition of the White Star Lines, extended its bus operations by 197 miles; Wisconsin Power & Light Company extended its bus routes 168 miles, replacing all trolley car service in the city of Janesville, Wis., and 1.75 miles in Oshkosh, Wis. An exchange was made with the Royal Rapid Bus Company whereby three lines—Berlin to Juneau, 51 miles; Plymouth to Elkhart Lake, 7 miles, and Madison to Prairie du Sac, 35 miles—were traded for a 114-mile route from Madison, Wis., to Dubuque, Iowa. The Potomac Edison Company extended its routes 150 miles with bus service, of which 6.69 miles replaced trolley car route; Northern Ohio Power & Light Company extended its bus opera-



Additional electric railways which inaugurated bus service during the year bring the total to 370



Electric railways are now operating more than 12,000 buses



Substantial extensions to bus service in 1929 increase the mileage to 25,000

Digitized by Google

Bus Operations by Electric Railways and Subsidiary Companies—(Continued)

	No. Buses Jan. 1, 1930
*Plymouth & Brockton Street Ry	11
Springfield Street Ry	52
Union Street Ry	18
Worcester Consolidated Street Ry	62
Michigan	
City of Detroit, Department of Street Rys	533
Eastern Michigan Railways	352
Eastern Michigan Motor Buses	
*Grand Rapids, Grand Haven & Muskegon Ry	6
Grand Rapids R.R	13
Jackson Transportation Co	50
Southern Michigan Transportation Co.	
Kalamazoo Transportation Co	9
Lansing Transportation Co	19
*Menominee & Marinette Light & Traction Co.	15
Muskegon Traction & Lighting Co	2
Saginaw Transit Co	37
Minnesota	
Duluth Street Ry	16
Duluth Superior Coach Co.	
Twin City Rapid Transit Co	101
Twin City Motor Bus Co.	
Mississippi	
Mississippi Power Co.	
(Gulfport Division)	35
(Hattiesburg Division)	7
*(Meridian Division)	7
Mississippi Power & Light Co.	
*(Greenville Division)	4
(Vicksburg Division)	3
Missouri	
City Light & Traction Co	3
Kansas City, Clay County & St. Joseph Ry	12
Kansas City, Clay County & St. Joseph Auto Transit Co.	
Kansas City Public Service Co	76
Missouri Power & Light Co	2
Springfield Traction Co	14
St. Joseph Ry., Lt., Ht. & Pwr. Co	20
St. Louis Public Service Co	52
Montana	
Butte Electric Ry	5
Nebraska	
Lincoln Traction Co	22
Omaha & Council Bluffs Street Ry	32
New Hampshire	
*Dover, Somersworth & Rochester St. Ry	6
*Keene Electric Ry	7
*Laconia Street Ry	11
Laconia Transit Co.	
Nashua Street Ry	5
*Portsmouth Electric Ry	12
New Jersey	
Atlantic City & Shore R.R	34
Coast Cities Ry	33
Cumberland Traction Co	2
Five-Mile Beach Ry	6
*New Jersey Inter-Urban Co	10
Ocean City Electric R.R	1
Public Service Co-Ordinated Transport	2,337
Trenton Transit Co	35
New York	
Black River Traction Co	16
Watertown Transportation Co.	
Brooklyn & Queens Transit Corp	28
Brooklyn Bus Corp.	
Buffalo & Erie Ry	6
Buffalo & Erie Coach Company	
Cortland County Traction Co	3
Cortland County Bus Lines	
Eastern New York Utilities Corp	3
Eastern New York Transportation Co.	
Empire State Rys	6
Mid-State Coach Lines	
Fonda, Johnstown & Gloversville R.R	5
*Geneva, Seneca Falls & Auburn R.R	3
Hamburg Railway	16
*Hudson Valley Ry	24
Hudson Transportation Co.	
*Huntington Traction Co	5
Huntington Coach Corp.	
International Ry	90
International Bus Corp.	
Jamestown Street Ry	21
Jamestown Motor Bus Transportation Co.	
Kingston Consolidated R.R	6
Kingston City Transportation Co.	
*Newburgh Public Service Co	22
*New York & Stamford Ry	62
County Transportation Co.	
New York State Rys. (Rochester)	84
Rochester Interurban Bus Co.	
Rochester Rys. Co-Ord. Bus Lines.	
East Ave. Bus Co.	
Darling Bus Line.	
New York State Rys. (Syracuse)	32
Syracuse Rys. Co-Ord. Bus Line.	
New York State Rys. (Utica)	14
Utica Rys. Co-Ord. Bus Line.	
Niagara Gorge R.R	6
Niagara Gorge Bus Line	
*Peekskill Lighting & R.R. Corp	29
Peekskill Motor Bus Corp.	
*Port Jervis Transit Co	2
Poughkeepsie & Wappingers Falls Ry	6
Rochester & Syracuse R.R	1
Mid-State Coach Lines.	
Schenectady Ry	24
Schenectady Rapid Transit Co.	
Syracuse & Eastern R.R	6
Syracuse & Eastern Bus Lines.	
Southern New York Ry	4
Manson Transportation Co.	
Third Ave. Ry	184
Surface Transportation System	
Triple Cities Traction Co	20
Binghamton Ry. Bus Line	
United Traction Co	90
Capitol District Transp. Co.	
*Walkill Transit Co	8
Waverly, Sayre & Athens Trans. Co	5
North Carolina	
Carolina Power & Light Co	3
Durham Public Service Co	19
North Carolina Public Service Co	16
Greensboro Bus Co.	
Southern Public Utilities Co	20
Tidewater Power Co	2
Coast City Transit Co.	
North Dakota	
Northern States Power Co	4
Northern Transit Co.	
Ohio	
City of Ashtabula—Division of Street Rys	4
Cincinnati Hamilton & Dayton Ry	4
Blue Bus Co.	
Cincinnati, Lawrenceburg & Aurora Electric Street Ry	7
Cincinnati Street Ry	98
Cleveland Ry	187
Cleveland, Southwestern Ry. & Light Co	19
Southwestern Bus Co.	
Columbus, Delaware & Marion Elec. Co	4
Columbus Railway, Power & Light Co	6
Community Traction Co	128
Dayton Street Ry	3
Dayton & Xenia Ry	2
Indiana, Columbus & Eastern Traction Co	20
Dayton & Columbus Transportation Co.	
Lake Shore Electric Ry	3
Lorain Street Ry	8
Maumee Valley Co	13
Maumee Valley Transp. Co.	
Nelsonville-Athens Electric Ry	1
Nelsonville Transp. Co.	
Northern Ohio Power & Light Co	283
Ohio Public Service Co	5
Penn-Ohio Public Service Corp	34
Pioneer Transportation Co	50
Columbus & Zanesville Transp. Co.	
Portsmouth Public Service Co	11
Springfield Ry	1
Steubenville, East Liverpool & Beaver Valley Traction Co	3
West End Traction Co	10
Youngstown Municipal Ry	69
Youngstown & Suburban Ry	13
Youngstown & Suburban Transportation Co.	
Columbiana Bus Co.	
Youngstown Suburban Tourist Lines.	
Oklahoma	
Northern Oklahoma R.R	2
Oklahoma Ry	48
Oklahoma Union Ry	83
Union Transportation Co.	
*Shawnee-Tecumseh Traction Co	12
United Service Co	7
Oregon	
Commission of Public Docks, Portland	1
Oregon Electric Ry	1
Portland Electric Power Co	48
Oregon City Motor Bus Co.	
Pennsylvania	
Allentown & Reading Traction Co	3
Altoona & Logan Valley Electric Ry	23
Logan Valley Bus Co.	
Beaver Valley Traction Co	9
Beaver Valley Motor Coach Co.	
*Berwick & Nescopeck St. Ry	2
*Chambersburg & Shippensburg Ry	6
Cumberland Valley Transp. Co.	
*Citizens Traction Co	33
Citizens Transit Co.	
Conestoga Traction Co	4
Conestoga Transp. Co.	
East Penn Traction Co	9
East Penn Transportation Co.	
Erie Ry	24
Erie Coach Co.	
Johnstown & Somerset Ry	1
Johnstown Traction Co	34
Traction Bus Co.	
Southern Cambria Bus Co.	
Beaverdale and South Fork Bus Co.	
Lackawanna & Wyoming Valley R.R	5
Laurel Line Bus Co.	
Lehigh Traction Co	14
Hazleton Auto Bus Co.	
Lehigh Valley Transit Co	22
Lehigh Valley Transportation Co.	
Lewiston & Reedsville Electric Ry	9
Lewiston Transportation Co.	
*Lewisburg, Milton & Watsonville Pass. Ry. Co.	3
*North Branch Bus Co	10
Philadelphia & Westchester Traction Co	33
Philadelphia Rapid Transit Company	340
Philadelphia Rural Transit Co.	
Pittsburgh Rys	86
Pittsburgh Motor Coach Co.	
Pittsburgh, Mars & Butler Ry	7
Pittsburgh, Harmony, Butler & New Castle Ry.	
Harmony Short Line Motor Transport Co.	
*Pocono Motor Coach Co	10
Reading Transit Co	6
Schuylkill Transportation Co	16
Scranton, Montrose & Binghamton Ry	2
Scranton Ry	19
Scranton Bus Co.	
Shamokin & Edgewood Elec. Ry	9
Shamokin & Treverton Bus Line.	
Shamokin & Mt. Carmel Transportation Co	3
Ashland & Centralia Auto Bus Co.	
Southern Penn Traction Co	35
Southern Penn Bus Co.	
*United Traction Street Ry	2
Dubois Transit Co.	
*West Chester Street Ry	35
Chester Valley Bus Line	
Westmoreland County Ry	6
Chestnut Ridge Transp. Co.	
West Penn Rys	25
Penn Bus Lines.	
Ohio Valley Transit Co.	
Westside Electric Rys	5
Westside Motor Transit Co.	
Wilkes-Barre Ry	33
Wyoming Valley Autobus Co.	
Williamsport Railways	3
Williamsport Transportation Co.	
Woodlawn & Southern Street Ry	6
Rhode Island	
*Newport & Providence Ry	34
United Electric Rys	130
South Carolina	
South Carolina Gas & Electric Co	8
Spartanburg Bus Co.	
Southern Public Utilities	1
South Dakota	
*Sioux Falls Traction System	27
Tennessee	
Knoxville Power & Light Co	6
Nashville Interurban Ry	9
Interurban Bus Co.	
Nashville Railway & Light Co	18
Tennessee Electric Power Co	15
Union Traction Co	1
Texas	
Abilene Traction Co	5
Austin Street Ry	9
Bryan College Traction Co	2
Dallas Ry. & Terminal Co	25
Eastern Texas Electric Co	25
J. G. Holtzclaw Bus Line.	
El Paso Electric Co	7
Houston Electric Co	75
Northern Texas Traction Co	27
Nueces Ry	6
*Rio Grande Valley Traction Co	5
San Antonio Public Service Co	88
*Southwestern Transit Co	4
Texas Electric Ry	6
Wichita Falls Traction Co	11
Utah	
Bamberger Electric R.R	2
Bamberger Transportation Co.	
Utah Light & Traction Co	18
Utah-Idaho Central R.R	5
Utah Rapid Transit Co	2
Vermont	
*Burlington Rapid Transit Co	20
*Twin State Gas & Electric Co	3
Virginia	
Lynchburg Traction & Light Co	3
Petersburg, Hopewell & City Point Ry	3
Roanoke Railway & Electric Co	7
Virginia Electric & Power Co	229
Virginia Public Service Co	5
Citizen's Rapid Transit Corp.	

Digitized by Google

Bus Operations by Electric Railways and Subsidiary Companies—(Concluded)

	No. Buses Jan. 1, 1930
Washington	
Grays Harbor Ry. & Light Co.	13
North River Transportation Co.	
Twin City Transit Co.	
Lewiston-Clarkson Transit Co.	4
Puget Sound Power & Light Co.	41
North Coast Trans. Co.	
Portland-Seattle Stage Co.	
Pacific Northwest Traction Co.	
Seattle Municipal St. Ry.	48
Seattle & Rainier Valley Ry.	2
Tacoma Municipal Belt Line	1
Tacoma Ry. & Power Co.	23
Tacoma Bus Co.	
Yakima Valley Transportation Co.	3
West Virginia	
Charleston Interurban R.R.	6
Midland Trail Transit	
New River Transit	
Red Bird	
Monongahela-West Penn Public Service Co.	48
Monongahela Transport Co.	
Ohio Valley Electric Ry.	18
Ohio Valley Bus Co.	
Wheeling Public Service Co.	4
Bus Transportation Co.	
Wheeling Traction System	52
Ohio Valley Transit Co.	
Wisconsin	
Madison Rys.	9
Milwaukee Electric Ry. & Light Co.	169
Wisconsin Motor Bus Lines.	
Mississippi Valley Public Service	2
Wisconsin Gas & Electric Co.	11
Wisconsin Michigan Power Co.	20
Intercity Bus Company	
Wisconsin Power & Light Co.	74
Wisconsin Public Service Corp.	18
Wisconsin Valley Electric Co.	7
Valley Transit Co.	
Wyoming	
*Cheyenne Motor Bus Co.	9
Hawaii	
Honolulu Rapid Transit Co.	12
Philippine Islands	
Manila Electric Co.	82
Porto Rico	
Ponce Electric Co.	4
Canada	
Brantford & Hamilton Electric Ry.	5
Brantford Municipal Ry.	1
British Columbia Electric Ry.	23
British Columbia Transit Co.	
Dominion Power & Transmission Co.	5
Grand River Ry.	3
Canadian Pacific Transport Co.	
Hamilton, Grimsby & Beamsville Electric Ry.	7
Hamilton Street Ry.	28
Hydro-Electric Rys.	17
Levis Tramways	1
London Street Ry.	11
Montreal Tramways	100
Moose Jaw Electric Ry.	3
New Brunswick Power Co.	1
Niagara, St. Catherines & Toronto Ry.	3
Ottawa Electric Ry.	14
Pictou County Electric Co.	4
Quebec Railway Light & Power Co.	12
Sherbrooke Ry. & Power Co.	4
Toronto Transportation Commission	206
Gray Coach Lines.	
Winnipeg Electric Ry.	48
*Woodstock, Thames Valley & Ingersoll Electric Ry.	3

tions 150 miles, 37.9 miles of which replaced trolley service, and the Boston Elevated Railway added 84 miles to its bus routes during the year.

Abandonment of all railway operations in favor of bus service is reported by the following companies, the substitution having been completed this year. The Atlantic and Suburban Railway, Atlantic City, N. J., discontined operation with the abandonment and subsequent sale of its line between Absecon and Somers Point via Pleasantville. The Atlantic City & Shore Railroad is now operating a bus line over this route. The Bethlehem Transit Company ceased operating on Jan. 12, 1929, and most of its track was taken up during the summer months. The Lehigh Valley Transit Company began bus operations in this territory on Jan. 22. In South Carolina, the Augusta-Aiken interurban line was acquired by the South Carolina Power Company through a merger and abandoned in July of this year. Augusta has electric railway service supplied by the Georgia Power Company, while the service between Augusta and Aiken as well as to other points in the Southeastern states is supplied by the independent Camel City Coach Company. In Pennsylvania, the West Chester Street Railway discontinued its entire railway operations on Dec. 1, 1929, and abandoned 28 miles of single track. The Chester Valley Bus Lines, which always has been closely identified with the railway, is now operating bus service in lieu of that formerly given by the trolley. Likewise, the Burlington Rapid Transit Company in Vermont, the Sioux Falls Traction Company in South Dakota, Hamilton Radial Railway in Canada, Puget Sound Power & Light Company, Chehalis, Wash., and the Vermont Company have abandoned all railway operations and through a subsidiary or affiliated bus company have substituted bus service. Included in the total number of bus operating railways are 55 companies which have abandoned all rail service. These companies operate 620 buses on 1,650 miles of route.

The Arkansas Valley Interurban Railway, Wichita, Kan., sold a bus line of 76.5 miles to an operating company with a contract for joint rates and interchange of business, and the Northeast Oklahoma Railroad suspended its bus operations entirely. A small number of other companies abandoned some negligible bus mileage on lines that had been extended into new territory and later proved financially unsatisfactory.

In contrast to these abandonments, ten companies inaugurated bus operations for the first time. The Street Railway of Phoenix, Ariz., purchased buses to cover a new route of 7.75 miles; City Light & Traction Company, Sedalia, Mo., replaced 7.2 miles of car route with buses; the Berkshire Street Railway, Pittsfield, Mass., substituted 21-passenger buses for the trolley car service formerly rendered by the Vermont company, and the Mississippi Power & Light Company, Greenville division, replaced 8.5 miles of trolley service with bus service. In Canada, the Brantford & Hamilton Electric Railway used buses for the first time this year.

Two important and interesting changes in bus operations were effected in 1929. First was the purchase of the companies previously controlled by the O. G. Schultz Management operating in southern New Jersey by Public Service Co-ordinated Transport, Newark, N. J. Twenty-one companies operating eighteen lines were involved in the sale.

The second large step in the unification of all surface transportation of a community was effected in St. Louis with the purchase of the People's Motor Bus Company by the City Utilities Company and the subsequent agreement for co-ordinated operation between this latter company and the St. Louis Public Service Company, now operating all trolley service. Although the People's Motor Bus Company will for the present be operated independently, it will be in friendly co-operation with the electric railway system and the Public Service Company will have the right to purchase the bus company when financial and franchise situations in St. Louis shall warrant.

The City Utilities Company recently acquired 38 per cent of the common stock of the St. Louis Public Service Company and now the purchase of the People's Motor Bus Company gives it a monopoly on the major transportation facilities of the city.

Further co-ordination of car and bus operations, with a number of minor substitutions of buses for cars, is practically assured for the near future. Many properties are continuing to operate some unprofitable lines which will soon require new track, overhead or paving and the question of substitution of bus service on these routes will have to be considered. In some cases it will be found to be economically sound to rebuild the present structure, while again, in many instances, buses will

Digitized by Google

Buses Bought by Railways During 1929

Name of Company	Total	Total Type	Type Chassis	Body Builder	Seating Capacity
Alabama					
Alabama Power Co. (Gadsden Div.)	4	4	White	Bender	29
Arizona					
Phoenix Street Railway	2	†2	Studebaker	Studebaker	21
Tucson Rapid Transit Co	1	1	Dodge	Dodge	21
California					
Los Angeles Motor Bus Co	2	2	Twin Coach	Twin Coach	40
Los Angeles Railway	22	8	Twin Coach	Twin Coach	40
		6	White	White	..
		8			
Municipal Railway of San Francisco	1	1	Mack	Mack	..
Pacific Electric Railway	14	*3	Moreland	Moreland	25
		*1	White	Motor Transit	25
		10	Twin Coach	Twin Coach	40
Pacific Gas & Electric Co	4	4	Yellow Coach	Yellow Coach	21
San Diego Electric Ry	9	6	Twin Coach	Twin Coach	39
		3	Fageol	Fageol	..
Colorado					
Denver Tramway	13	3	White	Bender	25
		2	Mack	Mack	..
		2	A.C.F.	A.C.F.	..
		*1	Dodge	Local	24
		*3	Dodge	Dodge	21
		*1	Reo	Fitzjohn	21
		*1	Studebaker	Studebaker	18
Connecticut					
Connecticut Co	23	21	Mack	Mack	29
		2	Yellow Coach	Yellow Coach	29
Danbury Power and Transportation Co	1	1	Yellow Coach	Yellow Coach	21
Groton-Stonington Traction Co	1	1	Twin Coach	Twin Coach	40
New Haven & Shore Line Ry	16	5	Twin Coach	Twin Coach	37
		11	Twin Coach	Twin Coach	21
Delaware					
Delaware Electric Power Co.	5	5	Yellow Coach	Yellow Coach	29
District of Columbia					
Capital Traction Co	13	4	Yellow Coach	Yellow Coach	29
		3	Yellow Coach	Yellow Coach	29
		1	A.C.F.	A.C.F.	29
		*5	Fageol	Fageol	27
Washington Railway & Electric Co	18	12	Yellow Coach	Yellow Coach	21
		6	Yellow Coach	Yellow Coach	29
Florida					
Jacksonville Traction Co	4	4	Twin Coach	Twin Coach	40
Georgia					
Georgia Power Co	13	4	Reo	Fitzjohn	23
		3	White	White	23
		6	Yellow Coach	Yellow Coach	23
Savannah Electric & Power Co	12	7	Twin Coach	Twin Coach	40
		2	Yellow Coach	Yellow Coach	21
		3	Mack	Mack	29
Idaho					
Boise Street Car Co	4	4	White	Bender	25
Illinois					
Chicago & Illinois Valley R.R.	5	3	Yellow Coach	Yellow Coach	21
		*2	Dodge	Dodge	21
Chicago North Shore & Milwaukee R.R.	18	10	Yellow Coach	Lang	22
		6	A.C.F.	A.C.F.	30
		2	A.C.F.	A.C.F.	39
Chicago & West Towns Ry.	5	5	Mack	Cummings	29
Evanston Railway	10	†5	Yellow Coach	Yellow Coach	39
		*2	Yellow Coach	Yellow Coach	21
		*3	Yellow Coach	Yellow Coach	29
Illinois Power & Light Corp. Champaign	2	2	Yellow Coach	Yellow Coach	29
Illinois Power & Light Corp. Decatur	3	3	Yellow Coach	Yellow Coach	29
Illinois Power & Light Corp. Galesburg	7	7	Yellow Coach	Yellow Coach	21
Illinois Power & Light Corp. Jacksonville	1	*1	Dodge	Dodge	21
Illinois Power & Light Corp. Quincy	6	6	Yellow Coach	Yellow Coach	21
Illinois Power & Light Corp. Springfield	3	3	Mack	Mack	25
Joliet, Plainfield and Aurora Trans. Co	2	1	Will	Eckland	30
		*1	Yellow Coach	Yellow Coach	21
Rockford Electric Co	2	2	A.F.C.	A.C.F.	40
Indiana					
Beech Grove Traction Corp.	5	5	Reo	Fitzjohn	21
Indianapolis, Columbus & Southern Traction Co	2	2	Dodge	Dodge	21
Indianapolis Street Railway	18	3	Dodge	Dodge	21
		8	White	White	29
		5	Mack	Mack	29
		2	Mack	Mack	21
Interstate Public Service	2	2	Dodge	Dodge	21
Northern Indiana Power Co.	2	2	International	Burket	15
Southern Indiana Gas & Electric Co	7	3	Dodge	Dodge	21
		4	Yellow Coach	Yellow Coach	29
Terre Haute, Indianapolis & Eastern Traction Co	14	*8	White	White	28
		*4	Mack	Mack	28
		*1	Ruggles	Ruggles	22
		*1	Ruggles	Ruggles	25

Name of Company	Total	Total Type	Type Chassis	Body Builder	Seating Capacity
Iowa					
Cedar Rapids & Iowa City Ry	8		Yellow Coach	Yellow Coach	21
	*3		Mack	Mack	25
Clinton, Davenport & Muscatine Ry	2	2	Yellow Coach	Yellow Coach	21
Fort Dodge, DesMoines & Southern R.R.	8	3	Yellow Coach	Yellow Coach	21
		5	Reo	Fitzjohn	20
Interstate Power Co	2	2	Mack	Mack	25
Iowa Southern Utilities Co.	9	9	Mack	Mack	25
Mississippi Valley Elec. Co.	1	1	Yellow Coach	Yellow Coach	21
Tri-City Railway of Iowa	5	3	Yellow Coach	Yellow Coach	29
		2	Mack	Mack	29
Kentucky					
Kentucky Traction & Terminal Co	8	6	Yellow Coach	Yellow Coach	29
		2	A.C.F.	A.C.F.	29
Kentucky Utilities Co	4	4	Yellow Coach	Yellow Coach	21
Louisville Railway	3	3	Yellow Coach	Yellow Coach	29
Louisiana					
Louisiana Electric Co	3	3	Dodge	Dodge	17
New Orleans Public Service, Inc	7	7	Yellow Coach	St. Louis Car Co.	34
Maine					
York Utilities Co	1	1	Studebaker	Studebaker	15
Maryland					
Cumberland & Westernport Transit Co	4	3	White	Bender	29
		1	Yellow Coach	Yellow Coach	29
Potomac Edison Co	22	2	International	Lang	27
		6	Yellow Coach	Yellow Coach	21
		5	White	Bender	25
		3	Studebaker	Studebaker	21
		2	White	White	20
		2	White	White	25
		1	White	White	17
		1	Studebaker	Studebaker	20
United Railways & Electric Co	12	5	A.C.F.	A.C.F.	30
		7	White	Bender	19
Massachusetts					
Berkshire Street Railway	4	4	Yellow Coach	Yellow Coach	21
Boston Elevated Railway	26	1	White	Farnum Nelson.	33
		1	White	Farnum Nelson.	39
		5	A.C.F.	A.C.F.	40
		†5	A.C.F.	A.C.F.	36
		5	Twin Coach	Twin Coach	37
		9	Twin Coach	Twin Coach	39
Boston, Worcester & New York Street Ry	4	3	Mack	Mack	29
		1	A.C.F.	A.C.F.	29
Eastern Massachusetts St. Ry	19	11	Studebaker	Superior	21
		8	A.C.F.	A.C.F.	40
East Taunton Street Ry	1	1	Dodge	Dodge	21
Fitchburg & Leominster St. Railway	3	3	Studebaker	Studebaker	23
Gardner Templeton St. Ry	2	1	White	Bender	29
		1	Larrabee	Boston	20
Interstate Street Ry	7	2	Twin Coach	Twin Coach	29
		3	A.C.F.	A.C.F.	29
		2	White	White	23
Middlesex & Boston St. Ry.	16	16	White	Bender	29
Plymouth & Brockton St. Ry.	3	3	Mack	Wayne	40
Springfield Street Ry	5	3	Mack	Farnham Nelson	29
		2	Yellow Coach	Yellow Coach	25
Union Street Railway	4	2	Yellow Coach	Yellow Coach	29
		2	Yellow Coach	Yellow Coach	21
Worcester Consol. St. Ry.	3	1	Yellow Coach	Yellow Coach	25
		1	White	Brown	29
		1	White	Bender	25
Michigan					
Detroit Street Railway	27	25	Yellow Coach	Yellow Coach	29
		1	Dodge	Dodge	21
		†1	Twin Coach	Twin Coach	..
Eastern Michigan Railways	41	6	Yellow Coach	Yellow Coach	21
		8	A.C.F.	A.C.F.	29
		5	Fageol	Fageol	29
		2	Studebaker	Studebaker	21
		10	Yellow Coach	Yellow Coach	17
		10	Yellow Coach	Yellow Coach	33
Grand Rapids R.R.	2	2	Yellow Coach	Yellow Coach	21
Saginaw Transit Co	5	5	Yellow Coach	Yellow Coach	23
Minnesota					
Duluth Street Railway	2	2	Yellow Coach	Yellow Coach	21
Twin City Rapid Transit Co.	18	2	Will	Eckland	23
		2	Will	Eckland	29
		4	White	Eckland	29
		4	Mack	Eckland	29
		3	Mack	Lang	29
		†3	Yellow Coach	Eckland	32
Mississippi					
Mississippi Power & Light Co. (Greenville)	4	3	Dodge	Dodge	21
		1	White	Bender	15
Missouri					
City Light & Traction Co	3	3	Yellow Coach	Yellow Coach	23
Springfield Traction Co	3	3	Yellow Coach	Yellow Coach	23
St. Joseph Railway, Light, Heat & Power Co	14	4	Yellow Coach	Bender	21
		4	White	Bender	21
		6	Mack	Mack	29
Nebraska					
Omaha & Council Bluffs Street Ry	24	8	Yellow Coach	Yellow Coach	21
		8	White	Bender	29
		8	Douglas	Bender	29
New Jersey					
Atlantic City & Shore R.R.	9	9	Yellow Coach	Yellow Coach	29
Coast Cities Railway	8	4	Yellow Coach	Lang	37
		4	Yellow Coach	Yellow Coach	23

Digitized by Google

Buses Bought by Railways During 1929—(Continued)

Name of Company	Total	Total Type	Type Chassis	Body Builder	Seating Capacity
Five Mile Beach Elec. Ry.	2	2	Dodge	Dodge	21
New Jersey Interurban Co.	3	2	Hahn	Hahn	29
		1	Studebaker	Studebaker	21
Public Service Coordinated Transport	638	34	Yellow Coach	Yellow Coach	29
		94	Yellow Coach	Public Service	29
		50	Yellow Coach	Yellow Coach	39
		†161	Yellow Coach	Public Service	29
		†1	Yellow Coach	Lang	29
		†10	Yellow Coach	Lang	38
		24	Dodge	Dodge	21
		*264	Miscellaneous	.....	..
Trenton Transit Co.	4	4	Twin Coach	Twin Coach	40
New York					
Brooklyn & Queens Transit Corp.	24	12	A.C.F.	A.C.F.	40
		10	Twin Coach	Twin Coach	40
		2	Yellow Coach	Yellow Coach	38
Buffalo & Erie Railway	2	2	Mack	Fremont	21
Fonda, Johnstown & Gloversville R.R.	5	1	Mack	Mack	20
		4	Mack	Mack	25
Hamburg Railway	11	7	Mack	Birney	29
		2	Mack	Whitfield	33
		2	Mack	Mack	33
Jamestown Street Ry	5	2	.....	.....	21
		2	.....	.....	29
		1	.....	.....	26
New York State Railways, Rochester	37	18	Mack	Bender	33
		5	White	Bender	33
		10	White	Bender	38
		4	Mack	Bender	29
New York State Railways, Syracuse	13	9	Mack	Bender	30
		1	Mack	Bender	36
		3	Yellow Coach	Bender	30
Syracuse & Eastern R.R.	1	1	Reo	Fitzjohn	29
Third Avenue Railway	31	12	Versare	Versare	37
		10	White	White	41
		*9	Six Wheel	Six-Wheel	29
Triple Cities Traction Co.	3	*2	White	Bender	29
		*1	Brockway	Brockway	15
United Traction Co.	10	10	Twin Coach	Twin Coach	40
Waverly, Sayre & Athens Trac. Co.	5	5	Yellow Coach	Yellow Coach	21
North Carolina					
Carolina Power & Light Co., Raleigh Div.	1	1	Corbitt	Hackney	21
Durham Public Service Co.	2	2	White	White	..
North Carolina Pub. Service	1	1	Yellow Coach	Yellow Coach	21
Ohio					
Cincinnati Street Railway	22	4	Mack	Mack	25
		10	Mack	Mack	29
		8	Twin Coach	Twin Coach	40
City of Ashtabula (Div. of Street Rys.)	1	1	Dodge	Dodge	21
Cleveland Railway	25	5	Yellow Coach	Lang	38
		20	White	Lang	38
Cleveland, Southwestern Railway & Light Co.	15	9	White	Bender	29
		1	Yellow Coach	Yellow Coach	24
		1	Schacht	Schacht	24
		3	Studebaker	Miller	12
		1	Pierce Arrow	Pierce Arrow	29
Community Traction Co.	4	4	Mack	Mack	29
Lorain Street Railway	3	3	Yellow Coach	Yellow Coach	21
Northern Ohio Power & Light Co.	46	5	White	Lang	29
		41	Twin Coach	Twin Coach	40
Ohio Public Service Co.	2	2	Yellow Coach	Yellow Coach	21
Penn - Ohio Public Service Corp.	6	6	White	Bender	35
Pioneer Transportation Inc.	2	2	A.C.F.	A.C.F.	..
Portsmouth Pub. Serv. Co.	3	3	White	White	..
Youngstown Municipal Ry.	10	10	Twin Coach	Twin Coach	42
Oklahoma					
Oklahoma Railway	18	2	Sudebaker	Superior	21
		4	Dodge	Dodge	21
		6	Yellow Coach	Yellow Coach	23
		2	Yellow Coach	Yellow Coach	17
		3	Yellow Coach	Yellow Coach	21
		1	Dodge	Dodge	17
Oklahoma Union Railway	2	2	Mack	Mack	29
Oregon					
Commission of Public Docks	1	1	Federal	Wayne	16
Portland Electric Power Co.	6	5	A.C.F.	A.C.F.	40
		1	Twin Coach	Twin Coach	40
Pennsylvania					
Allentown & Reading Traction Co.	3	3	Mack	Mack	29
Altoona & Logan Valley Electric Railway	5	5	A.C.F.	A.C.F.	24
Beaver Valley Traction Co.	2	2	Yellow Coach	Yellow Coach	21
Citizens Transit Co.	9	8	A.C.F.	A.C.F.	33
		†1	A.C.F.	A.C.F.	33
East Penn Traction Co.	1	1	White	Bender	21
Erie Railways	5	5	Yellow Coach	Yellow Coach	23
Johnstown Traction Co.	7	7	Yellow Coach	Yellow Coach	21
Lehigh Traction Co.	3	3	Mack	Mack	29
North Branch Bus Co.	1	1	Reo	Fitzjohn	21
Philadelphia & Westchester Traction Co.	7	6	Twin Coach	Twin Coach	40
		1	White	Bender	29
Pittsburgh Railways	37	9	Yellow Coach	Yellow Coach	92
		5	Yellow Coach	Yellow Coach	21
		6	Yellow Coach	Lang	21
		12	White	Bender	21
		5	White	Fremont	21
Pocono Motor Coach Co.	2	2	Yellow Coach	Yellow Coach	21
Scranton Railway	5	2	A.C.F.	A.C.F.	23
		3	A.C.F.	A.C.F.	33
Southern Pennsylvania Traction Co.	6	6	Yellow Coach	Yellow Coach	29
West Penn Railways	4	4	Dodge	Dodge	21
Westside Motor Transit Co.	1	1	Yellow Coach	Yellow Coach	17
Woodlawn & Southern Street Ry.	6	6	Mack	Mack	29
Rhode Island					
Newport & Providence Ry.	4	4	White	White	..
United Electric Railways	72	4	Yellow Coach	Yellow Coach	29
		37	Twin Coach	Twin Coach	37
		31	White	Bender	33
South Dakota					
Sioux Falls Traction System	10	4	Reo	Fitzjohn	21
		4	Yellow Coach	Yellow Coach	21
		2	White	Bender	15
Tennessee					
Knoxville Power & Light Co.	6	6	Yellow Coach	Yellow Coach	23
Tennessee Electric Power Co.	5	1	Twin Coach	Twin Coach	40
		2	Studebaker	Studebaker	22
		2	Studebaker	Studebaker	14
Tennessee Transp. Co.	5	5	Studebaker	Studebaker	22
Texas					
Abilene Traction Co.	2	2	Reo	Fitzjohn	..
Austin Street Railway	4	4	Dodge	Dodge	21
Dallas Ry. & Terminal Co.	16	14	Dodge	Dodge	21
		2	Dodge	Dodge	14
Eastern Texas Electric Co.	6	*4	Yellow Coach	Yellow Coach	21
		2	White	Bender	41
El Paso Electric Co.	1	1	White	White	25
Houston Electric Co.	9	1	Twin Coach	Twin Coach	40
		1	Mack	Mack	33
		3	White	Bender	16
		2	White	Bender	21
		1	Twin Coach	Twin Coach	21
		1	Ford	Aero Car	16
Neuces Railway	1	..	.....	.....	..
Northern Texas Traction Co.	17	10	Twin Coach	Twin Coach	40
		6	Reo	Reo	21
		*1	Studebaker	Studebaker	16
San Antonio Pub. Serv. Co.	14	14	Reo	Fitzjohn	22
Utah					
Utah Light & Traction Co.	9	1	Studebaker	Stevens	13
		†7	Twin Coach	Twin Coach	..
		1	Twin Coach	Twin Coach	..
Utah Rapid Transit Co.	2	2	Pierce Arrow	Buffalo	25
Vermont					
Burlington Rapid Transit Co.	18	9	Dodge	Dodge	21
		6	Twin Coach	Twin Coach	40
		3	White	Bender	39
Twin State Gas & Elec. Co.	1	1	Yellow Coach	Yellow Coach	21
Virginia					
Lynchburg Traction & Light Co.	2	2	Dodge	Dodge	21
Petersburg, Hopewell & City Point Railway	1	1	Dodge	Dodge	21
Roanoke Railway & Electric Co.	8	4	Dodge	Dodge	21
		4	Yellow Coach	Yellow Coach	21
Virginia Elec. & Power Co.	30	30	Twin Coach	Twin Coch	40
Washington					
Pacific Northwest Traction Co.	4	2	A.C.F.	Newell	34
		2	A.C.F.	Newell	38
Seattle & Rainier Valley Ry.	1	1	Studebaker	Heiser	21
Tacoma Railway & Pwr. Co.	7	2	Mack	Mack	29
		4	Mack	Mack	37
		1	Mack	Mack	33
West Virginia					
Monongahela West Penn Public Service Co.	12	2	A.C.F.	A.C.F.	29
		4	Dodge	Dodge	21
		*6	Fageol	Fageol	26
Wheeling Traction Co.	47	3	White	Bender	29
		2	Dodge	Dodge	21
		*42	Misc.	Misc.	..
Wisconsin					
Milwaukee Electric Ry. & Light Co.	20	7	Twin Coach	Twin Coach	35
		7	Twin Coach	Twin Coach	38
		1	Wills	Eckland	35
		5	Yellow Coach	Yellow Coach	17
Mississippi Valley Pub. Serv.	2	2	Yellow Coach	Yellow Coach	23
Wisconsin Gas & Elec. Co.	1	1	Yellow Coach	Yellow Coach	29
Wisconsin Pwr. & Lt. Co.	15	8	Yellow Coach	Yellow Coach	22
		7	Yellow Coach	Yellow Coach	24
Wyoming					
Cheyenne Motor Bus Co.	1	1	Reo	Fitzjohn	21
U. S. Possessions					
Honolulu Rapid Transit Co.	3	3	White	White	21
Manila Electric Co.	46	..	Ford	Manila Elec.	17
		..	Chevrolet	Manila Elec.	17
		..	Dodge	Manila Elec.	17

Digitized by Google

Buses Bought by Railways in 1929—(Concluded)

Name of Company	Total	Total Type	Type Chassis	Body Builder	Seating Capacity
Canada					
Brantford & Hamilton Electric Railway	5	5	White	Bender	29
Brantford Municipal Ry	1	1	Yellow Coach	Yellow Coach	21
Dominion Power & Transmission Co	5	5	White	Bender	29
London Street Ry	5	5	Yellow Coach	Yellow Coach	23
Niagara, St. Catherines & Toronto Ry	3	2	Yellow Coach	Fisher	21
		1	Leyland	Smith	29
Ottawa Electric Ry	2	2	Yellow Coach	Yellow Coach	28
Sherbrooke Ry. & Power Co.	2	2	Yellow Coach	Yellow Coach	21
Toronto Transportation Commission	48	5	Yellow Coach	Yellow Coach	17
		20	Yellow Coach	Yellow Coach	21
		10	Yellow Coach	Lang	33
		*13	Misc.	Misc.	30
Winnipeg Electric Co	2	1	Reo	Freemont	25
		1	Mack	Mack	33

solve the financial and service problems by extending the present lines into new territory or rerouting them through more thickly populated districts. Utilization of the bus as a feeder to existing rail arteries is now recognized as sound practice and many railway companies have come out of the red figures into the black by careful readjustment of bus and trolley services.

As to the type of buses purchased this year, approximately 65 per cent were of a capacity seating 29 to 40 passengers, 25 per cent had a seating capacity of from 21 to 28 passengers, and 10 per cent were of less than the 21-passenger type. Of the more than 1,800 new buses purchased, approximately 200 were of the gas-electric type. Although a large number of the buses purchased were for use on new de luxe routes, such as interurban and interstate service, many companies are now purchasing a finer type of equipment for selected city service lines. This kind of bus appeals to a new class of rider, the automobile owner, and on week ends and holidays allows a surplus of de luxe equipment for special and chartered work.

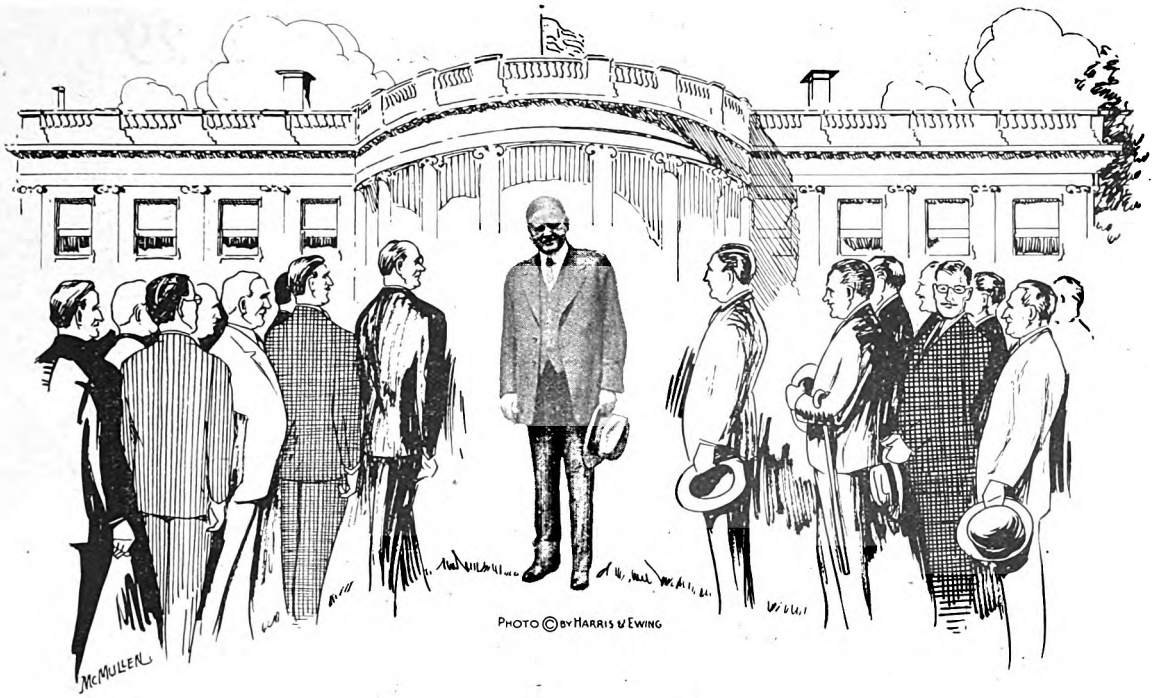
Bus Route Extensions, City and Intercity

	Miles
Alabama	
Alabama Power (Gadsden Div.)	1.15
Arizona	
Phoenix Street Railway	7.75
Tucson Rapid Transit Co	1.96
California	
Los Angeles Motor Bus Co	2.73
Los Angeles Railway	7.56
Municipal Railway of San Francisco	1.23
Pacific Electric Railway	33.20
Pacific Gas & Electric Co	1.58
Peninsular Railway	2.20
San Diego Electric Ry	2.40
Colorado	
Denver Tramway Corp	11.20
Connecticut	
Connecticut Co	46.49
Lordship Railway	3.00
Delaware	
Delaware Electric Power Co	12.49
District of Columbia	
Washington Railway & Electric Co	17.15
Florida	
Jacksonville Traction Co	22.30
Tampa Electric Co	1.10
Georgia	
Georgia Power Co	5.10
Savannah Electric and Power Co	5.80
Illinois	
Alton Railway	3.00
Chicago, North Shore & Milwaukee R.R	71.00
East St. Louis Railway	2.70
Evanston Railway	19.00
Illinois Power Co	1.06
Illinois Pwr. & Lt. Corp. (Galesburg Div.)	3.50
Illinois Power & Lt. Corp. (Quincy Div.)	3.89
Joliet, Plainfield and Aurora Trans. Co	44.00
Indiana	
Beech Grove Traction Corp	17.00
Chicago, South Shore & South Bend R.R	3.30
Indiana Service Corp	1.50
Indianapolis Street Railway	13.28
Interstate Public Service	2.50
Southern Indiana Gas & Electric Co	1.70
Terre Haute, Indianaplis & Eastern Trac. Co.	52.00
Iowa	
Clinton, Davenport and Muscatine Ry	30.00
Mississippi Valley Electric Co	1.50
Tri-City Railway of Iowa	2.75
Kansas	
Kansas City, Leavenworth & Western Ry	0.65
Kansas Power & Light Co	2.00
Wichita Falls Traction Co	1.10
Kentucky	
Kentucky Traction & Terminal Co	6.00
Kentucky Utilities Company	2.20
Louisville Ry	0.31
Louisiana	
New Orleans Public Service	5.97

	Miles
Maryland	
Potomac Edison Co	150.30
United Railways & Electric Co	15.40
Massachusetts	
Berkshire Street Ry	20.00
Boston Elevated Railway Co	84.03
Eastern Massachusetts Street Ry	30.95
Fitchburg and Leominster Street Ry	5.00
Gardner Templeton Street Ry	29.00
Middlesex and Boston Street Ry	15.59
Union Street Railway	2.00
Worcester Consolidated Street Ry	17.00
Michigan	
Eastern Michigan Railways	87.20
Minnesota	
Northern States Power Co	1.20
Twin City Rapid Transit Co	1.75
Mississippi	
Mississippi Pwr. & Lt. Co. (Greenville)	8.50
Missouri	
City Light and Traction Co	7.20
Kansas City Public Service Co	12.18
St. Joseph Railway, Lt., Heat, & Pwr. Co	6.30
St. Louis Public Service Co	3.00
Nebraska	
Omaha & Council Bluffs Street Ry	6.80
New Jersey	
Coast Cities Railway	8.70
Five Mile Beach Electric Ry	2.20
Public Service Coordinated Transport	1,108.00
New York	
Buffalo and Erie Railway	18.90
Fonda, Johnstown and Gloversville R.R	5.56
Hamburg Railway	33.00
International Railway	3.00
Jamestown Street Ry	6.40
New York & Stamford Railway	12.70
New York State Railways (Rochester Div)	26.80
New York State Railways (Syracuse Div.)	6.40
Syracuse & Eastern R.R	0.30
Third Avenue Railway	6.35
Triple Cities Traction Company	1.90
United Traction Co	5.69
Ohio	
Cincinnati Street Railway	3.20
Cleveland Railway	17.13
Cleveland Southwestern Ry. & Light Co	16.00
Columbus Railway, Power & Light Co	0.80
Community Traction Co	14.90
Northern Ohio Power & Light Co	149.26
Ohio Public Service Company	5.00
Penn-Ohio Public Service Corp	20.45
Pioneer Transportation, Inc	7.10
West End Traction Co	0.03
Youngstown Municipal Railway	5.70
Oklahoma	
Oklahoma Railway	87.18
Oregon	
Commission of Public Docks	1.50
Portland Electric Power Co	3.00

	Miles
Pennsylvania	
Beaver Valley Traction Co	0.20
Citizens Transit Company	1.40
East Penn Traction Co	8.00
Erie Railways	3.80
Philadelphia & West Chester Traction Co	1.00
Pittsburgh, Harmony, Butler & N. Castle Ry.	15.00
Pittsburgh Railways	63.25
Pocono Motor Coach Co	30.00
Scranton Railway	14.55
West Penn Railways	11.50
Rhode Island	
United Electric Railways	46.37
South Dakota	
Sioux Falls Traction System	10.28
Tennessee	
Knoxville Power & Light Co	6.15
Tennessee Electric Power Co	23.72
Tennessee Transportation Co	12.61
Texas	
Dallas Ry. & Terminal Co	9.00
Eastern Texas Electric Co	10.00
Houston Electric Co	8.39
Northern Texas Traction Co	16.85
San Antonio Public Service Co	5.08
Utah	
Utah Light & Traction Co	1.14
Vermont	
Burlington Rapid Transit Co	24.70
Virginia	
Lynchburg Traction & Light Co	0.10
Virginia Electric & Power Co	7.27
Washington	
Pacific Northwest Traction Co	28.00
Seattle Municipal Street Ry	5.10
West Virginia	
Monongahela West Penn Public Service Co.	147.77
Wheeling Traction Co	197.60
Wisconsin	
Milwaukee Electric Ry. & Light Co	35.57
Wisconsin Power & Light Co	168.00
Wisconsin Public Service	2.40
Wyoming	
Cheyenne Motor Bus Co	6.50
U. S. Possessions	
Manila Electric Co	38.07
Honolulu Rapid Transit Co	6.80
Canada	
Dominion Power & Transmission Co	11.00
Brantford & Hamilton Electric Ry	24.00
British Columbia Electric Ry	18.00
Hamilton Street Ry	1.50
Hydro-Electric Railways (Kingsville)	4.00
Hydro-Electric Railways (Windsor)	5.00
London Street Ry	3.30
Montreal Tramways	0.25
Ottawa Electric Railway	5.50
Sherbrooke Railway & Power Co	50.00
Toronto Transportation Commission	147.04
T. T. C. Radial Lines	30.20
Winnipeg Electric Co	0.92

Digitized by Google



It's *Sand* That Keeps the Wheels from Slipping

By

G. J. MacMURRAY

News Editor *Electric Railway Journal*

Atlantic City on New Jersey's shore!
Its boardwalk free, but nothing more!
To which sweet spot each year or so
A. E. R. A. decides to go
To hold a bus and street car show,
Converse and hear dear Old Bill Wise
Socratic facts clothed in disguise—
How good 'tis now this all to ponder
And then to sit at ease and wonder
When transportation's apogee will come
As a result of all that's said and done.
So once again with pen in hand
We scan the facts from all the land
To glean good cheer for all the crew
Rightly to start the year anew,
With shining thoughts for June's debate
Under Paul Shoup at the Golden Gate.

SOME TIME ago a wit remarked that in these United States too many persons were riding around in Lincolns who ought to be using Fords and that too many others were using Fords who ought to be pushing wheelbarrows. This, of course, was exaggeration for the sake of emphasis, but back of it was the scintilla of common sense so often spoken in jest. Anyway, a lot of us have learned that we have to do more than give ourselves a close shave each morning in order to be prepared for the day's grind. This ought to be encouraging to local transportation managers and disheartening to taxicab drivers. There ought to be some cheer in the fact that 1929 the local transportation industry did a gross business in excess of $1,000,000,000, but then some pessimist will arise to ask what the net was, not realizing that to a considerable degree the net depends on the individual. The pessimists are like the black little boy who stood straight and stiff and still beside the front of the house whose dead master was about to be buried. When the minister arrived, a lady whispered to this straight, still, little boy:

"Dere's de preacher. Service gwine to start now. Ain't you gwine in?"

"Ah can't, mum," mumbled the boy. "Ah's de crêpe."

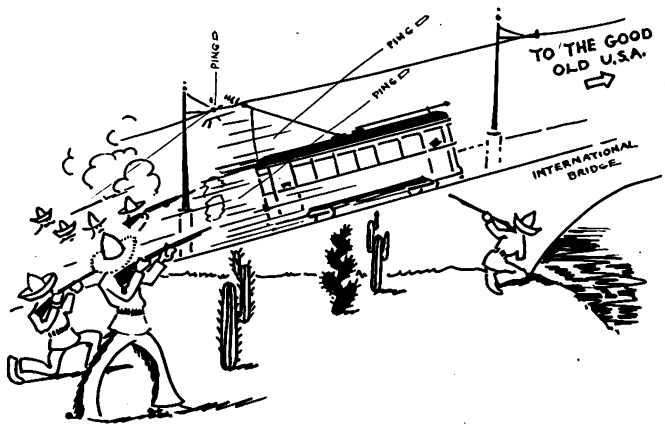
These fellows are the crêpe.

Crêpe and crêpehangers are all right in their place, but they haven't any place in the local transportation industry. The need is for more men conscious of their powers—more men like the Irishman at the dinner where every guest had to make a speech, sing a song or tell a story. Well, when this Irishman's time came, he said:

Digitized by Google

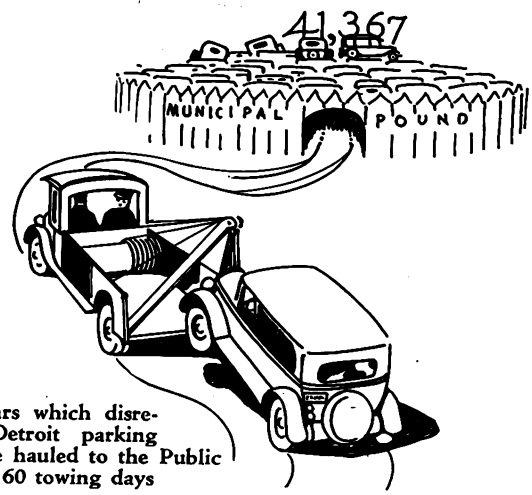
Side Lights on News Events of 1929

Taxi rate wars didn't help the taxis much. Springfield, Mass., and Philadelphia were among the cities to see the folly of unrestrained taxi operation.

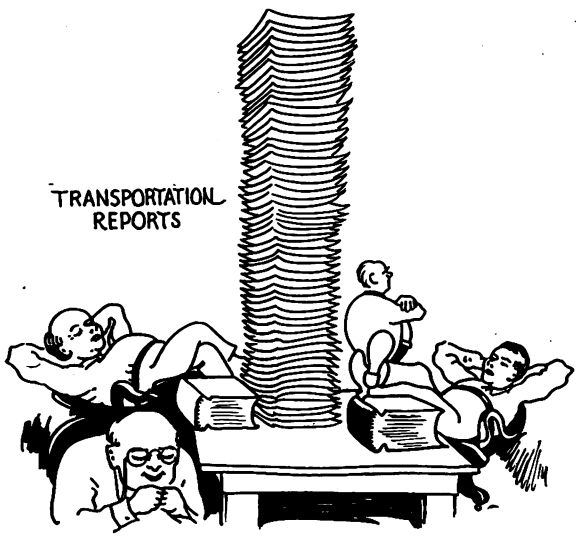


When Mexicans across the border from El Paso got careless with firearms, the cars run over the international bridge scooted for the U. S. A.

Historical and commercial subjects were included in a film of Virginia's development made by the utility at Richmond as a contribution to the state's progress.



41,367 cars which disregarded Detroit parking rules were hauled to the Public Pound in 60 towing days



City officials at Chicago sleep while reports on the transportation situation accumulate. The pile is now 6 ft. high, weighs 200 lb. and cost $1,500,000.

Los Angeles has a lot of Sunny Jims, people who realize that the increased fare allowed there is going to react to their benefit.

Digitized by Google

"Friends, I can't make a speech, or sing a song, or tell a story, but I'll fight any man in the room."

That man was conscious of his powers. Local transportation men, who do know transportation, need more of this Irishman's will to do. After all, a grapefruit is only a lemon that has been given a chance and taken advantage of it.

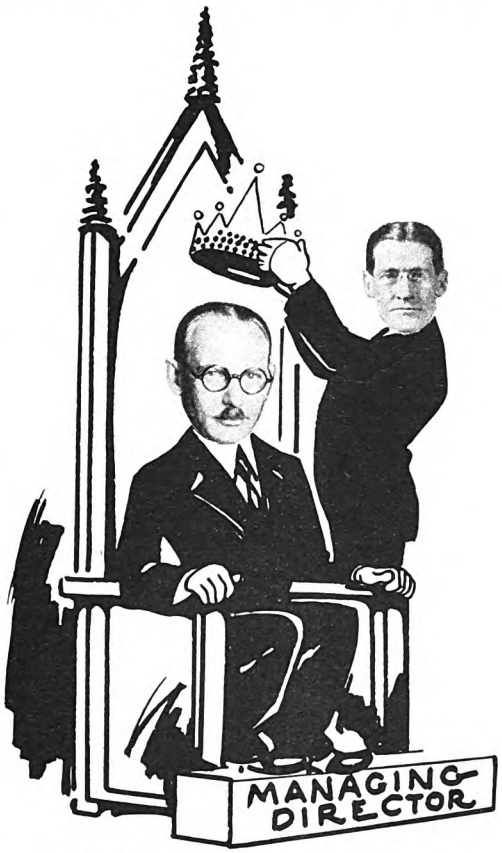
Statistical facts appear to indicate that the industry is very much like Hiram, Mary's beau. "Mary," began Hiram, "you know I got a clearin' over thar an' a team and wagon and some hawgs an' cows an' I calc'late on buildin' a house this fall an'—"

Just then he was interrupted by Mary's mother in the kitchen.

"Mary," she called in a loud voice, "is that young man thar yit?"

Back came the answer, "No, mar, but he's gittin' thar."

And the local transportation service is getting there. Let's look at the facts. Rail service is being modernized, buses are being co-ordinated with cars, city-wide taxicab fleets taken over, and in a few instances, airplanes used in supplemental service. The private motor remains the most serious competitor of the co-ordinated services. Buses no longer are considered as serious competitors. Most of the important urban bus lines have been absorbed by rail line managements, about 12,500 buses being operated by the electric railways in conjunction with 80,000 passenger rail cars. Most of the independent bus operators are now found running interstate service. That's how things have changed. The American drug store isn't what it used to be, and neither is the local transportation business. It would not do for a drum major to have an inferiority complex.



Charles Gordon was installed in the office of managing director

Fares are at the peak for all time, averaging approximately $8\frac{2}{5}$ cents for the entire country. The greatest single unit of cash fare is 10 cents. Less than a score of cities have a nickel fare, and most of them are small. Where 5-cent fares obtain, special reasons are responsible. In New York, Subway deficits are paid from taxes. In New Jersey a zone ride system obtains. On the municipal system in San Francisco taxes are refunded. There are a few small cities in which the interurbans charge 5 cents within the city limits as a part of a higher fare for service outside of the town.

Wages have held an even keel, there being a change of less than $\frac{1}{2}$ cent an hour during the last year. Little change in taxes is noted. Net revenue for the first six months of 1929 has been 1.75 per cent higher for the entire country than it was during 1928. This is due to increased fares. Traffic for the same corresponding period is off $\frac{3}{4}$ of 1 per cent for the entire co-ordinated systems. The total of passengers carried last year was 16,000,000,000, divided 15,000,000,000 rail cars and 1,000,000,000 buses. Expenses are 1.9 per cent lower. The number of car-miles run is off only $\frac{1}{2}$ of 1 per cent.

In this business, if you're going to survive, you've just got to be undaunted and adaptable, like the piano tuner a traveler met in the West some time ago. It was the fellow traveler and not the piano tuner who was unimaginative.

"Surely," said the commiserative one, "I shouldn't imagine that pianos were very plentiful in this region."

"No, they are not," said the piano tuner, "but I make a pretty fair income tightening up barbed wire fences."

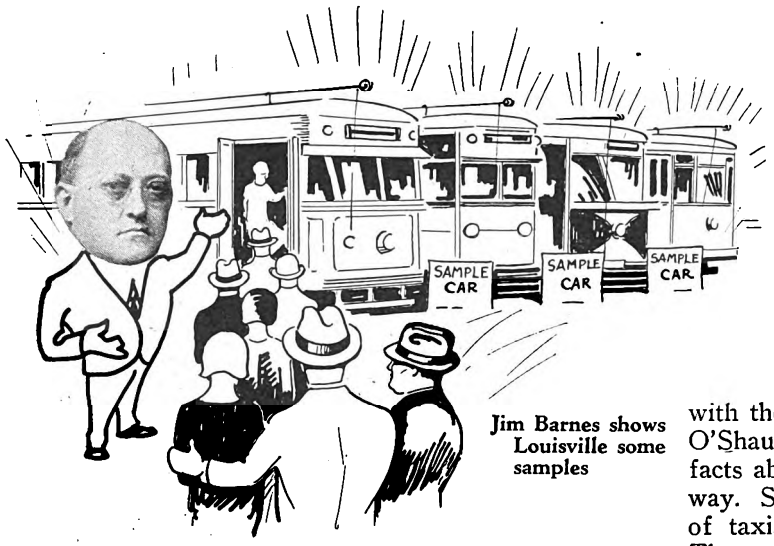
As Ed Wickwire said in Atlantic City, "Remember that Noah floated the ark when the rest of the world was in liquidation." There are some things we don't have to prove. You admit them, as the student did who was asked if he could prove that the square of the hypotenuse is equal to the sum of the squares of the legs of the triangle. Didn't Jack Shannahan on behalf of the association tell Mr. Hoover at the conference in Washington that statistics indicated that this industry was spending more than $1,000,000 a day during 1929 and probably would equal or even exceed this amount during the year 1930?

With all due respect to Mr. Wickwire, the bon mot of the Atlantic City convention was the remark by President Barnes that it was the task of the industry today to provide the bones of transportation facilities and clothe them with the flesh of service. That may not be a perfect figure of speech, but it states the idea succinctly. Incidentally, Jim Barnes showed Louisville how he proposed to carry out the idea when he exhibited his four experimental cars. Second perhaps to Mr. Barnes in the forcefulness of his remarks came Thomas N. McCarter, who said that there had been a change in the character of the service which people want, but there had been no abatement in the total demand for local transportation. Certainly he has lived up to the idea of co-ordination, one of the latest moves of his company being to take over a large bus system in southern New Jersey.

It took a whole issue of the JOURNAL and four little daily journals to tell the story of the A. C. convention. We can't afford to get started on that subject, other than to say that we hope to greet Paul Shoup, the new president, out in San Francisco next June.

So much for that. The number of interesting facts about this industry is legion. At least the JOURNAL's index makes it appear so. But nobody is ever satisfied with this review—no more satisfied than was the owner of the hen who had by mistake been fed sawdust instead of oatmeal. This hen laid twelve eggs, sat on them and when they hatched, eleven of the chickens had wooden legs and the twelfth was a woodpecker. What, for instance, can I consistently make out of the fact that the Baltimore fare case is still pending, that Los Angeles got its fare increase, that Cleveland intends to advance

Digitized by Google



Jim Barnes shows Louisville some samples

its fares, that Louisville got a fare boost, that out in Oregon the Portland Electric Power Company needs a fare advance, and that in Cincinnati the demands of outlying sections for increases in service, if granted, would jeopardize the present fares under service at cost. On cars and fares it leads me to wonder:

What is a street car? Who can say?
Its face uplifted in recent years
Fills old timer's eyes with tears
O'er the shattered ideal of the one-horse shay.

What is a street car? A faithful chariot
Entrusted to a hopeful manager's care
To be run by him from here to there
At a fare that is adequate.

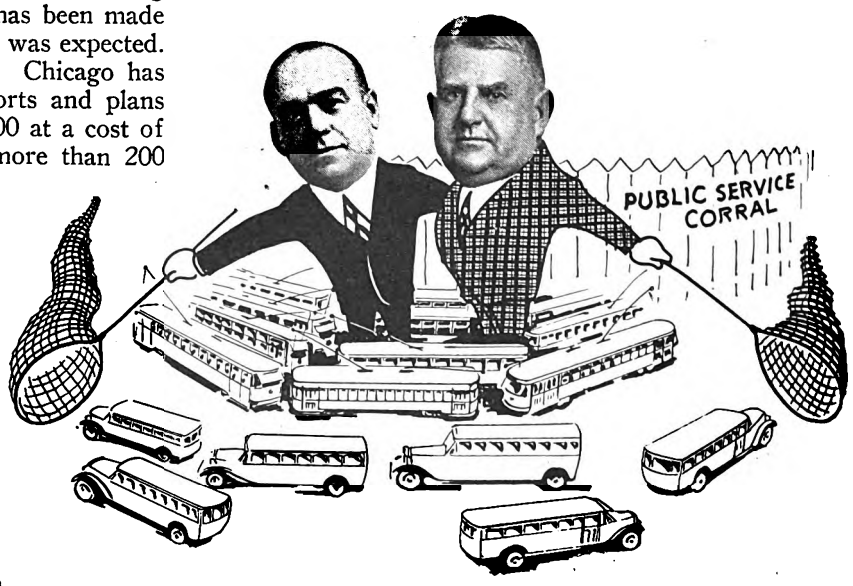
And what is the fare? Not even the prophets know.
Answer they can not, for it all depends
On what the management can achieve,
Whether the earnings may be made to show
Something left over for dividends.
That stockholders may not be left to grieve.

One of the most interesting things on fares contained in the year's news was the summary of the California Railroad Commission's report on results in that state rendered to the Commission for the District of Columbia where not only the question of fares but the matter of the consolidation of the two local railways is being agitated. In Illinois the Governor signed the bill looking toward unification in Chicago. Progress has been made in the windy city, but not to the extent that was expected. Samuel Insull lays the blame on politics. Chicago has sufficient facts to guide it. Subway reports and plans for a unified system there, made since 1900 at a cost of $1,500,000, stand 6 ft. high and weigh more than 200 lb. But Cleveland has gone right ahead. The Cleveland Railway, under Joe Alexander and the Van Sweringens, has actually developed a program of co-ordination which contemplates articulation of suburban trunk line operation, city street railway service, service by bus, transportation by taxi, and a rapid transit system. This development was the subject of a six-page story in the May issue. It is in the working out of this program that former Association Secretary Welsh will have a hand. Guy C. Hecker, who succeeded Mr. Welsh with the association, had his baptism of fire as secretary at the convention last October. St. Louis also appears to be coming along promisingly. The Transit Survey Commission there under R. F. Kelker, Jr., favors unification. If, as, and when the program is carried out, the recent purchase of the independent bus system by the holding company which controls the railway will be advantageous. There the skip-stop plan has been extended successfully by the railway. In San Francisco the purchase of the Market Street Railway by the city and the unification of that property with the lines of the present municipal railway are still under discussion, with the purchase price the chief stumbling block. Mr. O'Shaughnessy, the city engineer, did not gloss over the facts about the financial condition of the municipal railway. Seattle is still talking about articulation, regulation of taxis and what to do with the municipal railway. The municipal railway system is badly run down. It has borrowed from the water fund. Still the city raised trainmen's wages only to turn around and arrange with Stone & Webster for a two-year moratorium on the payment of the principal sum of the purchase price so as to obtain funds for rehabilitation. The Mayor hopes eventually to refinance the entire purchase on a long-term basis. The original purchase plan contemplated that the city would pay for the system out of earnings. The ills of the Seattle system are blamed on the two experiments with 5-cent fares. In other words, Seattle was to settle on the pay-as-you-go plan, but it isn't going anywhere.

While we are wandering around, there's the Detroit municipal system. The jitneys have been restrained. Service installed by the city to replace them—a service with small-capacity vehicles—seems to be highly satisfactory. City officials at Detroit are apparently undaunted by the defeat of the proposal to build a subway. In the matter of dealing with the parkers,

Detroit apparently has seen the light
And relieved itself of its traffic plight.
How it refused longer to be fooled
Was told to you by Harold Gould.

In New York the new subway to be run by the municipality is nearing completion. As Phillips put it in the New York *Sun*, the streets are so torn up for subway construction that the wags are beginning to



Messrs. McCarter and Boylan keep on gathering in the buses

Digitized by Google

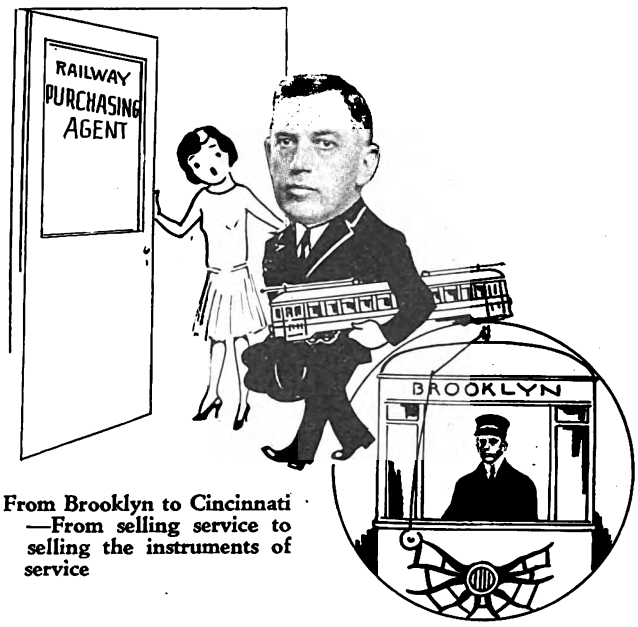
speak of it as a holey city. Wisely the city decided to purchase power for the new lines rather than to attempt to generate its own current. It is this system which will be unified with the privately-owned lines if a legislative program can be enacted satisfactory to Sam Untermyer, Jimmy Walker, Tammany Hall and the officers of the railways, including President Hedley of the Interborough. Well, the surface lines in Brooklyn were brought together by a consolidation in which the Brooklyn & Queens Transit Corporation was created. Incidentally, Clint Morgan, the former chief operating official of the Brooklyn City Railroad, jumped from the management end of the business to the selling end, with the Cincinnati Car Corporation. The United States Supreme Court remanded the Interborough's suit for a 7-cent fare back to the state courts. Meanwhile, Mr. Amster, as head of the stockholders' protective committee of the Manhattan Railway, and Mr. Hedley continue their passages at arms. In Philadelphia

> On banks, trolleys, buses and cabs
> Mitten Management still keeps tabs.
> It does it quite well beyond all doubt
> For it knows exactly what it's about
> Although old Philly's daily newspapers
> Claim to have uncovered some company capers.

Mr. Storrs, the chairman of the executive committee of the United Railways & Electric Company, Baltimore, did a good stroke in arranging new financing for that company. Baltimore, too, grappled successfully with the parking problem, and a milk company ordered its drivers to respect the rights of the street cars. Buses are being run there successfully in a 25-cent service. A new franchise was awarded in Youngstown, Ohio, and in Toledo the Milner service-at-cost grant was modified.

With one or two exceptions things were quiet in the South. Employees of the New Orleans Public Service, Inc., took it into their heads suddenly to strike on Aug. 2, during negotiations looking toward a new working agreement. After being on strike many weeks, and after the company felt it could no longer keep open the offer it made for the men to return, the strikers voted to accept the company's terms. This did not happen, however, until the men had sorrowfully learned that in ignoring the good offices of President Mahon and officials of the American Federation of Labor they had followed local labor prophets into the wilderness. There was also a

Service in Cleveland is being co-ordinated under President Alexander



From Brooklyn to Cincinnati —From selling service to selling the instruments of service

little fracas in El Paso, Tex. The railway there operates over the international bridge into Juarez, Mexico. Suddenly the Mexicans staged a shooting bee. Just as suddenly the cars scooted for home, there to remain until the insurrection had died down. This incident recalls the case of the Mayor who frantically wired to the Governor for Texas Rangers, to restore peace after a reign of terror started by gunmen. A special train came down from the capital and one lonely ranger stepped out.

"Where's the rest of the outfit?" demanded the Mayor and the sheriff.

"Rest, hell," replied the ranger mildly, "you ain't got but one riot going on here, have you?"

Jack Shannahan is doing quite well in Omaha. Remember the good-natured editorial, headed "The Miracle Man," in the *Morning World-Herald*. Even the New York *Times* had a feature about him. He's been adopted into the Ogallala Sioux Indian Tribe and given the tribal name of Hounska-Kle Ska, or spotted breeches. Mr. Shannahan still has his hands full with the question of the sale of the bridge between Omaha and Council Bluffs, owned by his company, to the cities, but promise is ahead for a settlement. He has cleared up the franchise matter, and has put into effect a rerouting plan, based on the survey by Ross Harris. That's working out well now, but, as is natural in a major move of this kind, there was some dissatisfaction and much good-natured joshing at first. It so happened that on the evening of the first day of the change the Ad-Sell League met. Since some of its members were affected by the rerouting the following song was received with enthusiasm:

> "Show us the way to go home,
> We're tired and want to go to bed;
> We had a little ride about an hour ago
> But we didn't know where it led.
> We've got a dizzy dome,
> No more do we want to roam
> In Mr. Shannahan's merry-go-round
> Show us the way to go home."

The Des Moines property changed hands and the men agreed to the modification of the terms of a long-time wage agreement which contained an iron-clad clause against one-man cars. It would appear now that a program of rehabilitation for Des Moines is ahead, no less efficacious than the one now under way in Omaha. The

Digitized by Google

Omaha's miracle man is made a Sioux Indian

Roanoke Railway & Electric Company has also done some unusual things in rehabilitating its property and in selling the service to the public, notably in its house-to-house campaigns. The Boston Elevated Railway has been quick to seize the opportunities presented by the traffic problem to win back many of its passengers. In this work it has turned to advertising for assistance.

Posters and printed matter played a prominent part in putting over the idea of the Pittsburgh campaign, which was called "Loftis Testimonial Week." The slogan, "For the Love of Mike Be Careful," was reproduced on an attractive placard which was posted at all carhouses during the week.

Penn-Ohio won the Class A Safety Medal for 1929, while the Brady Award in Class B went to the Tampa Electric Company and in Class C to the Tide Water Power Company. Many other companies did effective newspaper advertising, particularly safety advertising. A very effective piece of advertising was the historical and industrial film prepared by the Virginia Electric & Power Company to stimulate home interest in Virginia and the industries of Virginia. Fred Cummings, of the Eastern Massachusetts, made a notable contribution to the subject of merchandising with his article in the issue of Sept. 14.

According to Secretary of Commerce Lamont, traffic congestion costs the nation $2,000,000,000 a year. The full story of Chicago's effort to curtail parking was told in detail by Charles Gordon in an elaborate article in the JOURNAL for Feb. 23. The victory in securing proper traffic control and in abating the parking menace is not going to be won in a day. Of course, restrictions will help, but better yet will it be when drivers realize the significance of the little poem run by the Northern Ohio Power & Light Company, Akron, in *Service News:*

> I'm blocked in front, I'm blocked behind,
> Till I'm afraid I'll lose my mind.
> The hours that I have spent right here,
> Watching street cars pass so near,
> Have taught me what I won't forget—
> This parking business is all wet.

The Pittsburgh car was a notable contribution to the art during the year, as were the new cars for Louisville, Albany and Detroit. Comment on cars would not be complete without reference to the increase in the interest in the trackless trolley, reflected in the added installations in Salt Lake City and New Orleans, and in the numerous proposals for the use of this vehicle, notably in Chicago and Detroit.

One of the best studies of the interurban problem was the paper by Dr. Thomas Conway, president of the Cincinnati, Hamilton & Dayton Railway, entitled "Courage, Faith and Vision Will Advance Interurbans," presented at the Atlantic City convention. There have been several instances of the extension of the pick-up and delivery service by the interurbans, in the Central West and the roads on the Coast notably on the system at Los Angeles.

In most large cities, and many small ones as well, all business faces the problems of congestion and deficiency in efficient local transportation. These are community and public problems that require the application of sound principles for their solution. Electric railways are endeavoring to improve their facilities and service despite a long period of inadequate earnings and consequent restricted credit. That's preparedness for you and preparedness is merely the act of wearing spectacles to breakfast, when you know you're going to have grapefruit.

An officer once reported to Lord Kitchener that he had been unable to carry out an assigned task and gave his reason. Kitchener made this reply: "Your reason for not doing it is the best I ever heard. Now go ahead and do it." In this industry at this time it's the courage of the Vikings that's needed. It was not the Roman army that conquered Gaul, but Caesar. It was not the Carthaginian army that made Rome tremble in her gates, but Hannibal. It was not the Macedonian army that reached Indus, but Alexander. The problems of economics are not settled by oratory.

New Orleans men allowed themselves to be led into labor's wilderness by false local prophets

Digitized by Google

Rolling Stock Purchases LARGELY INCREASED

Nearly 1,300 passenger cars, 130 freight and service cars and 77 electric locomotives were bought during 1929 by the electric railways. Cars for handling heavy traffic on city surface lines predominated. Large car orders also were placed for rapid transit lines and for electrified suburban service. Interurbans purchased comparatively few new cars

By

TH. M. van der STEMPEL

Assistant Editor *Electric Railway Journal*

PURCHASES of new rolling stock by the electric railways during 1929 exceeded those of 1928 by a large amount. A total of 1,496 new cars and locomotives were bought last year as compared with 897 the year before. Included in the total for 1929 are 663 for city surface lines, 300 for rapid transit lines, 240 for electrified suburban service and 79 for interurbans. More than 130 freight and miscellaneous cars were ordered during the year just ended and 77 electric locomotives. In 1928, a total of 601 cars were bought for city surface lines and 93 for interurban service. In that year orders were placed for 171 freight and service cars and 32 electric locomotives.

A total of 58 electric railway companies are listed among the purchasers in 1929 as compared with 46 the preceding year. Of this number 49 are located in the United States and nine in Canada. Of the number of purchasers in this country 24 bought cars for city service and fifteen for interurban service. In Canada the figures are eight and two respectively. Three companies in the United States added to their equipment for electrified suburban service.

The largest single purchase of cars during the year just ended was 300 for the city-owned rapid transit lines in New York City. Next in size was the order for 141 multiple-unit cars for the electrified suburban service of the Lackawanna Railroad. Among the large orders for surface line cars placed last year were 106 for the Cleveland Railway, 101 for the Brooklyn & Queens Transit Corporation and 100 each for the Department of Street Railways, City of Detroit, and the Chicago Surface Lines. The Montreal Tramways placed an order for 50 cars, of which 25 are motorized and 25 trail. The only other order placed during 1929 for trail cars was that of the Washington, Baltimore & Annapolis Electric Railroad for nine such units, making the total for the year 34 as compared with 20 trailers ordered in 1928. The Market Street Railway of San Francisco built 25 cars in its own shops. The Lynchburg Traction & Light Company bought 20 cars for city service. Besides the purchase of passenger cars already mentioned, three orders of 15 cars each were placed during the year, one of 13 cars, seven of 10, one of 7, two of 6, five of 5, one of 4, three of 3, four of 2 and eleven orders for single cars.

Large capacity double-truck cars for two-man operation predominated in the purchases last year. The 307 cars ordered for Cleveland, Detroit and Chicago are straight two-man cars. The 25 motor cars purchased by the Montreal Tramways are designed to operate as one-man cars during non-rush hours but are used for train service at rush hours with the 25 trail cars bought by the same railway. All of the 101 cars ordered by the Brooklyn & Queens Transit Corporation are designed for one-man operation, as also were those for the Lynchburg Traction & Light Company. The other orders were divided between one-man and one-man two-man design. Only two single-truck cars were bought, one by the Third Avenue Railway and the other by the railway in Porto Rico.

Summary of Car Purchases

	United States	Canada	Total
Number of companies reporting purchase of new cars	49	9	58
CITY SERVICE			
Single truck	1	...	1
Double truck	851	86	937
Trailers	.....	25	25
Total cars for city service	852	111	963
INTERURBAN SERVICE			
Motor cars	59	10	69
Trailers	9	1	10
Express and freight	130	...	130
Miscellaneous	7	...	7
Total cars for interurban service	205	11	216
MULTIPLE-UNIT SUBURBAN CARS	240	...	240
ELECTRIC LOCOMOTIVES	77	...	77
Grand total	1,374	122	1,496

Digitized by Google

Rolling Stock Ordered During 1929

Name of Company	No.	Class	Type of Service	Motor or Trailer	Single or Double Truck	Length Over All Ft. In.	Total Weight Lbs.	Number of Motors	Seating Capacity
California									
San Francisco, Napa & Calistoga Ry.	1	Bag. & Mail	Interurban	Trailer	Double	56— 0	.....	.....	.....
Pacific Gas & Electric Co., Sacramento	12	Passenger	City	Motor	Double	41— 6½	.....	2	44
Sacramento Northern R.R.	1	Locomotive	.....	.....	.....	.....	120,000	.....	.....
Connecticut									
New York, New Haven & Hartford R.R.	10	Passenger	Suburban	Motor	Double	79— 7¼	.....	4	80
Delaware									
Delaware Electric Power Co.	10	Passenger	City	Motor	Double	42— 1½	35,360	4	44
Illinois									
Chicago Surface Lines	100	Passenger	City	Motor	Double	48— 4	44,440	4	60
Illinois Traction Co.	4	Locomotives	.....	.....	.....	.....	.....	.....	.....
	100	Freight	Interurban	Trailer	Double	.....	.....	.....	.....
Indiana									
Gary Rys.	2	Passenger	Interurban	Motor	Double	44—10	40,000	4	50
Indianapolis & Southeastern R.R.	3	Passenger	Interurban	Motor	Double	45— 2	38,000	4	40
Iowa									
Des Moines Railway	10	Passenger	City	Motor	Double	.....	.....	.....	52
Fort Dodge, Des Moines & So. R.R.	1	Locomotives	.....	.....	.....	.....	150,000	.....	.....
Kentucky									
Kentucky Traction & Terminal Co.	1	Passenger	Interurban	Motor	Double	.....	.....	.....	44
Louisville Railway	1	Passenger	City	Motor	Double	43— 3	33,993	4	51
	1	Passenger	City	Motor	Double	46— 3	37,980	4	51
	1	Passenger	City	Motor	Double	41— 2¾	29,000	4	47
Maryland									
Washington, Baltimore & Annapolis R.R.	9	Passenger	Interurban	Trailer	Double	58— 1	65,200	.....	58
	1	Express	Interurban	Motor	Double	55— 0	.....	4	.....
Massachusetts									
Greenfield & Montague Transportation Area	2	Passenger	Interurban	Motor	Double	39— 1½	33,000	4	44
Union Street Railway, New Bedford	12	Passenger	City	Motor	Double	44— 0	32,000	4	54
Michigan									
Department of Street Rys., Detroit	101	Passenger	City	Motor	Double	58— 5	.....	4	52
Missouri									
St. Louis Public Service Co.	1	Passenger	City	Motor	Double	.....	.....	.....	62
New Jersey									
Delaware, Lackawanna & Western R.R.	141	Passenger	Suburban	Motor	Double	71— 0	148,000	4	84
New York									
Brooklyn & Queens Transit Corp.	100	Passenger	City	Motor	Double	45— 6	34,000	4	53
	1	Passenger	City	Motor	Double	45— 0	27,500	4	52
City of N. Y. Board of Transportation	300	Passenger	City	Motor	Double	60— 6	85,000	2	60
New York Central R.R.	10	Passenger	Suburban	Motor	Double	.....	.....	2	100
	42	Locomotives	Freight	.....	.....	.....	.....	6	.....
Third Avenue Ry.	1	Passenger	City	Motor	Single	38— 9½	26,980	2	44
United Traction Co., Albany	1	Passenger	City	Motor	Double	42— 8½	32,000	4	44
Long Island R.R.	†40	Passenger	Suburban	.....	.....	.....	.....	.....	.....
North Carolina									
North Carolina Pub. Serv. Co., Greensboro	5	Passenger	City	Motor	Double	41— 5	34,200	4	41
Ohio									
Cincinnati, Hamilton & Dayton R.R.	20	Passenger	Interurban	Motor	Double	43— 9	45,000	4	44
	6	Service	Interurban	Motor	.....	.....	.....	.....	.....
	6	Freight	Interurban	Trailer	.....	.....	.....	.....	.....
Cleveland Railway	100	Passenger	City	Motor	Double	53— 6½	47,000	4	55
	6	Passenger	City	3 Duplex units	3 Trucks per unit	.....	.....	.....	100
Cleveland Union Terminals Company	22	Locomotives	Passenger	.....	.....	80— 0	204,000	.....	.....
Dayton & Troy Electric Railway	4	Passenger	Interurban	Motor	Double	45— 2	40,000	4	48
Indiana, Columbus & Eastern Traction Co.	15	Freight	Interurban	Trailer	.....	.....	.....	.....	.....
	8	Freight	Interurban	Motor	.....	.....	.....	.....	.....
Lima-Toledo R.R.	20	Passenger	Interurban	Motor	Double	.....	.....	4	44
Youngstown Municipal Railway	13	Passenger	City	Motor	Double	40— 6	30,000	4	45
†Lorain Street Railroad	10	Passenger	City	Motor	Double	41—10½	36,000	4	48
Oklahoma									
Oklahoma Railway	10	Passenger	City	Motor	Double	33— 5	26,060	4	36
Pennsylvania									
Altoona & Logan Valley Electric Ry.	5	Passenger	City	Motor	Double	42— 6	36,200	4	54
Pennsylvania Railroad	*36	Passenger	Suburban	Motor	Double	.....	.....	.....	72
	* 3	Passenger	Suburban	Motor	Double	.....	.....	.....	52
	2	Locomotives	.....	.....	.....	.....	.....	.....	.....
Pittsburgh Railways	1	Passenger	City	Motor	Double	45— 3	27,000	4	42
Scranton Railway	10	Passenger	City	Motor	Double	42— 6	35,900	4	54
York Railways	1	Passenger	Interurban	Motor	Double	.....	.....	.....	50
Tennessee									
Nashville Interurban Ry.	2	Passenger	Interurban	Motor	Double	44— 2	39,000	4	45
Virginia									
Lynchburg Traction & Light Co.	20	Passenger	City	Motor	Double	40—10	34,680	4	41
Washington									
Great Northern	4	Locomotives	Passenger	.....	.....	.....	.....	.....	.....
Yakima Valley Transportation Co.	3	Passenger	City	Motor	Double	40—10	.....	4	40
West Virginia									
Monongahela West Penn Pub. Serv. Co.	3	Passenger	Interurban	Motor	Double	47— 3	35,000	4	48
Newell Bridge & Ry. Co.	2	Passenger	City	Motor	Double	45— 3	32,220	4	46
Wisconsin									
Milwaukee Electric Ry. & Light Co.	15	Passenger	City	Motor	Double	45— 0	38,840	4	55
Wisconsin Power & Light Co.	1	Locomotive	.....	.....	.....	.....	.....	.....	.....
Porto Rico									
Porto Rico Ry., Light & Power Co.	1	Passenger	Interurban	Motor	Single	.....	.....	.....	28
DOMINION OF CANADA									
British Columbia Electric Ry.	15	Passenger	City	Motor	Double	46— 2	39,200	4	50
Calgary Municipal Ry.	6	Passenger	City	Motor	Double	46— 2	39,400	4	53
Hamilton Street Ry.	12	Passenger	City	Motor	Double	.....	.....	.....	44
Hydro-Electric Power Commission	4	Passenger	Interurban	Motor	Double	51— 2	58,000	4	50
	1	Passenger	Interurban	Trailer	Double	51— 2	44,500	.....	49
Montreal Tramways	25	Passenger	City	Motor	Double	46— 2	37,000	4	42
	25	Passenger	City	Trailer	Double	46— 2	.....	.....	57
Quebec Railway, Light & Power Co.	15	Passenger	City	Motor	Double	41— 2	38,700	4	40
	6	Passenger	Interurban	Motor	Double	65— 0	85,000	.....	37
Regina Municipal Ry.	7	Passenger	City	Motor	Double	41— 1¾	34,000	4	49
Saskatoon Municipal Railway	5	Passenger	City	Motor	Double	39— 3	30,400	4	41
Winnipeg Electric Co.	1	Passenger	City	Motor	Double	.....	.....	.....	52

*Converted from steam to electric. †Motorized trailers.

Digitized by Google

As is usual, there was considerable variation in the dimensions, weights and seating capacities of the cars ordered last year. The length of the double-truck cars for city service varies between 33 ft. 5 in. and 53 ft. 6½ in., the average being about 43 ft. 6 in. Weights for this type of car range from 26,000 lb. to 47,000 lb., with an average of approximately 36,500 lb. Seating capacities vary from 36 to 62 per car. Among the interurban motor passenger cars there is less variation, the average length being about 48 ft. 8 in. with a weight of 40,916 lb. The cars purchased for New York rapid transit service have a length of 60 ft. 6 in. and weigh 85,000 lb. Even larger than these are the cars bought for the electrified suburban service of the Lackawanna Railroad, their length being 71 ft. and their weight 148,000 lb. Other additions to motorized cars for electrified suburban service are 39 cars which are being converted by the Pennsylvania Railroad from steam operation to electric operation, and 40 cars of the Long Island Railroad which are being motorized.

New Rolling Stock Ordered Since 1907

Year	Passenger Cars City	Passenger Cars Interurban	Freight and Miscellaneous Cars	Electric Locomotives	Total
1907	3,483	1,327	1,406	(a)	6,216
1908	2,208	727	176	(a)	3,111
1909	2,537	1,245	1,175	(a)	4,957
1910	3,571	990	820	(a)	5,381
1911	2,884	626	505	(a)	4,015
1912	4,531	783	687	(a)	6,001
1913	3,820	547	1,147	(a)	5,514
1914	2,147	384	479	(a)	3,010
1915	2,072	336	374	(a)	2,782
1916	3,046	374	491	31	3,942
1917	1,998	185	223	49	2,455
1918	1,842	255	278	44	2,419
1919	2,129	128	172	18	2,447
1920	2,889	227	465	17	3,598
1921	1,059	129	81	7	1,276
1922	2,910	187	405	34	3,536
1923	2,915	427	595	92	4,029
1924	1,985	538	1,538	31	4,092
1925	1,054	320	238	47	1,659
1926	1,249	309	264	60	1,882
1927	824	121	363	40	1,348
1928	601	93	171	32	897
1929	963	319	137	77	1,496

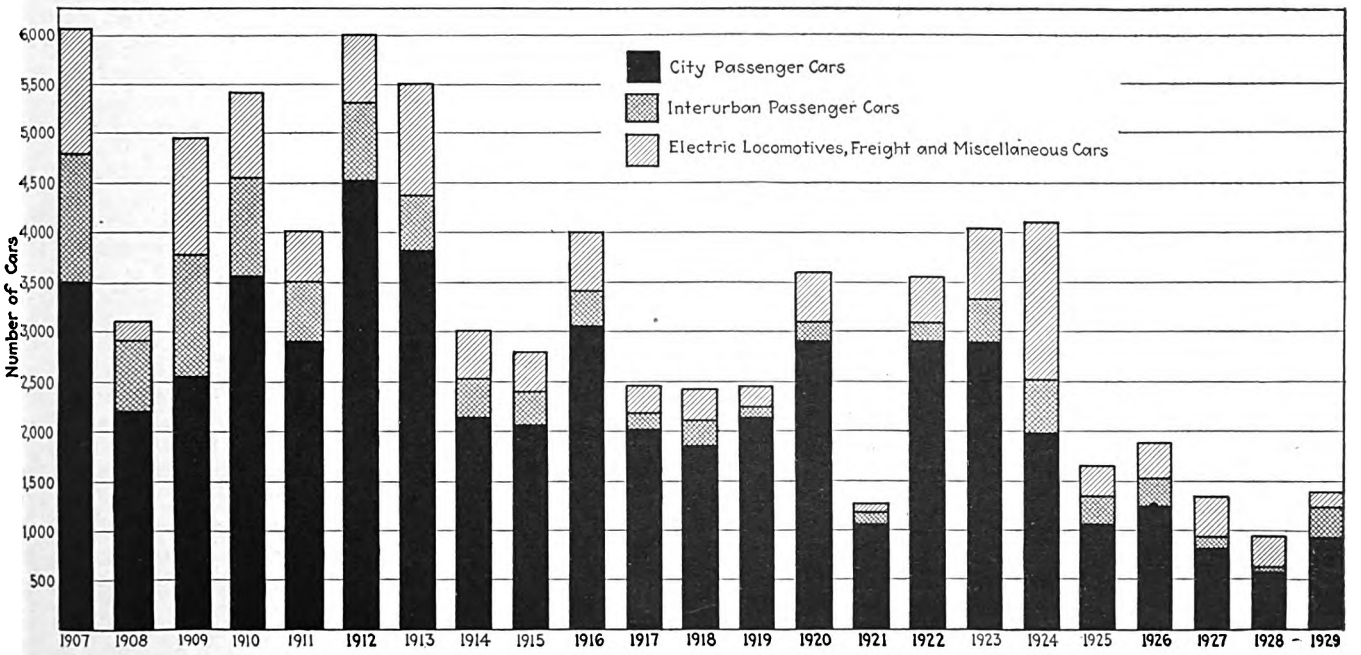
(a) Included in "Freight and Miscellaneous Cars."

Number of Cars Owned by Electric Railways by Years

Year		Passenger Motor	Passenger Trailer	Freight Motor	Freight Trailer	Locomotives	Service	Others	All Cars
1920	United States.	77,722	6,027	1,215	7,441	751	5,723	6,809	105,688
	Canada.....	4,269	136	133	612	53	53	714	5,970
	Total.....	81,991	6,163	1,348	8,053	804	5,776	7,523	111,658
1921	United States.	77,921	6,142	1,324	7,712	760	7,005	4,754	105,618
	Canada.....	4,348	138	134	538	54	67	717	5,996
	Total.....	82,269	6,240	1,458	8,250	814	7,072	5,471	111,614
1922	United States.	75,442	7,624	1,375	7,903	772	8,761	2,795	104,672
	Canada.....	4,413	312	143	575	56	168	531	6,198
	Total.....	79,855	7,936	1,518	8,478	828	8,929	3,326	110,870
1923	United States.	75,249	7,423	1,712	8,442	814	8,971	2,435	105,046
	Canada.....	4,262	365	134	646	62	213	448	6,130
	Total.....	79,511	7,785	1,846	9,088	876	9,184	2,883	111,176
1924	United States.	75,678	6,768	1,790	9,016	799	9,092	2,491	105,634
	Canada.....	4,267	364	136	642	62	212	442	6,125
	Total.....	79,945	7,132	1,826	9,658	861	9,304	2,933	111,759
1925	United States.	74,898	6,737	1,760	9,138	809	9,004	2,370	104,716
	Canada.....	4,311	367	130	637	67	232	463	6,207
	Total.....	79,209	7,104	1,890	9,775	876	9,236	2,833	110,023
1926	United States.	73,694	7,050	1,960	9,850	870	8,731	2,600	104,755
	Canada.....	3,945	368	125	629	67	313	380	5,827
	Total.....	77,639	7,418	2,085	10,479	937	9,044	2,980	110,582
1927	United States.	72,030	7,355	2,265	10,500	910	8,474	2,950	104,484
	Canada.....	3,878	354	297	618	64	382	57	5,650
	Total.....	75,908	7,709	2,562	11,118	974	8,856	3,007	110,134
1928	United States.	69,963	7,660	2,488	11,037	948	8,208	3,286	103,590
	Canada.....	3,706	364	249	472	62	419	51	5,323
	Total.....	73,669	8,024	2,737	11,509	1,000	8,627	3,337	108,913
1929	United States.	67,035	7,001	1,857	11,342	946	8,749	3,325	100,255
	Canada.....	3,831	368	244	469	65	449	49	5,475
	Total.....	70,866	7,369	2,101	11,811	1,011	9,198	3,374	105,730

New York led all other states in the amount of new rolling stock purchased for electric railway operation last year with a total of 411 cars and 42 electric locomotives. This numerical superiority was due largely to the big order for rapid transit cars and the order of 101 surface cars for Brooklyn. Ohio was second with a total of 146 cars and 26 electric locomotives. Other states which bought more than 100 cars included New Jersey, Michigan and Illinois.

At the same time that the electric railways bought these 1,404 cars, 2,325 old cars were junked or otherwise disposed of. This is by far the largest number that has been scrapped in any year of record. The next highest



Total purchases of electric railway rolling stock increased to a marked extent in 1929 over the 1928 figure

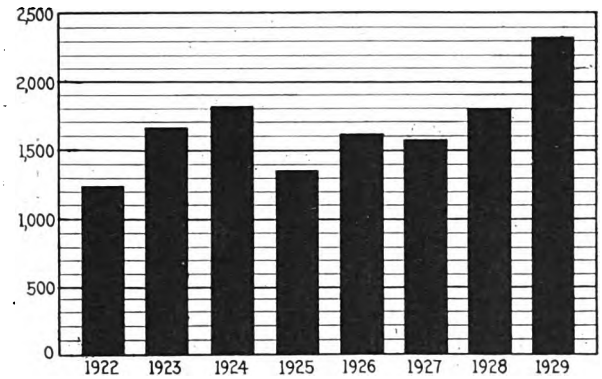
Digitized by Google

number reported was 1,853 in 1924, followed closely by 1,819 in 1928. The relative number of cars scrapped in each of the last seven years is shown in an accompanying diagram.

Interesting Developments in Design

Aside from the trends of the past year as shown by the statistics prepared in accompanying tables, interesting developments have occurred in design. Much effort has been spent by the manufacturers in the development of lighter and quieter trucks. Particular attention has been paid to securing faster acceleration and retardation. Some of the new cars equipped with high-speed motors accelerate at a rate of 3 m.p.h.p.s. and can attain a free running speed as high as 40 m.p.h. Improvements in braking have made it possible to secure a rate of retardation as high as 3½ or 4 m.p.h.p.s. without discomfort to the passenger. Foot control and automatic acceleration appear to be regarded favorably.

In several instances the cars ordered during the year



More than 2,300 old cars were scrapped in 1929, the largest number in any year of record

represent a radical departure from established precedent. While the majority of the orders are for equipment that follows more or less standard design, more attention has been given than ever before to improved general appearance. Designers have made a serious effort to create vehicles that are in keeping with their surroundings on the modern city street, but which will be an outstanding and desirable element in the picture. Attention has been directed to the balance in the general proportions, to lines and colors, to the curves of the roof, proportions of windows, shape of the ends, and to innumerable minor details that a few years ago were given little or no attention.

Greater attention also has been given to interior design and appointments, as well as to the exterior. Seats have been improved. Lines and colors have been selected to harmonize and to create a favorable impression in the mind of the rider. Care has been taken to facilitate entrance and exit, and to eliminate congestion near the doors and fare box.

Car Weights Greatly Reduced

Weights of cars purchased during the year have been reduced a great deal from the practice of a few years ago. Among the extremely light cars are one for Louisville which weighs 29,000 lb. and seats 47 passengers, or 620 lb. per passenger; the Union Street Railway of New Bedford, Mass., which weighs 32,000 lb. and seats 52 passengers, or 616 lb. per passenger; Pittsburgh Railways, weighing 27,000 lb. and seating 42 passengers, or 640 lb. per passenger; Scranton Railways, weighing 35,900 and seating 54 passengers, or 665 lb. per passenger. By far the lightest car listed is that built for the Brooklyn & Queens Transit Corporation, which, with a weight of 27,500 lb., seats 52 passengers, making the weight per passenger 530 lb.

While these examples of light-weight cars are in general sample designs, enough have been built to show that it is practicable to use in their construction those principles which have been expounded by the advocates of radical improvements. Practically all the car builders are represented in the list of these improved designs, and all the builders are using methods once considered revolutionary. Among these is the use of light-weight metals for structural parts as well as for trimmings. It is by the use of such methods that the weights have been reduced so radically.

It is not felt that the ultimate in weight reduction has been reached, by any means. Further study will make it possible not only to use light-weight metals as they have been employed in recent designs, but to modify other parts such as motors, controllers and air brake equipment to a greater extent than anything that has yet been attempted. Such changes will be possible on account of the very much lower weight of the body itself. The trucks are capable of redesign for less weight, as has been demonstrated in a few sample units. These changes in turn make it possible to increase the rates of acceleration and braking, even beyond the limits which have been referred to earlier in this article, and to do it without the necessity of having recourse to more powerful equipment.

Much Interest Shown in Special Designs

The purchase of special designs of cars has been made in larger quantities during the year just closed than in any similar period. This indicates that the interest taken in the subject is not merely a passing fancy, but that managements are becoming more and more alert to the necessity for taking advantage at once of the possibilities that lie in such changes. At the close of the year it is to be expected that more information as to the performance of these units in service will be available, and will form a basis on which to judge the merits of the several innovations incorporated in the recent designs. Such results are awaited with interest by all live operating men. It is not easy to predict in advance the exact effect of changes in design in passenger carrying vehicles but it is evident from past experience that the progress in car improvement has been productive of beneficial results.

Statistics given in the accompanying tables of rolling stock were obtained from replies to questionnaires sent to all electric railways in the United States and Canada. Replies were received from companies representing more than 97 per cent of the total track mileage. Through the co-operation of the manufacturers, lists of cars built by them during the year were furnished so that the replies received from railways could be checked very carefully. In a few cases where replies were not received from electric railways themselves, the information furnished by the car manufacturers has been used. Replies were received from all car manufacturers. In addition to the information obtained from these two sources, the files of Electric Railway Journal have been used extensively. Particular care has been used to verify figures which appeared doubtful and it is believed that the final data are complete and accurate.

Digitized by Google

Interest Revived in Trackless Trolley Operations

During the past two years this type of service has enjoyed a marked increase in popularity. More trackless trolleys were bought in 1929 than in any recent year. Seven companies are now operating 65 such vehicles. A synopsis of all operations since the first installation in 1910 is presented

DEVELOPMENTS of the past year indicate that the trackless trolley is again finding favor as a local transportation vehicle. Eight years ago it was the subject of considerable experimentation and much interest was shown in its possibilities. Numerous systems were established at the time by the railways, but abandonments during the period from 1923 to 1927 showed that it was losing popularity. With the coming of 1928, however, the manufacturers of equipment brought out new designs, resulting in a revival of interest in the trackless trolley. Indeed, the new models were so far removed from the old vehicles known as trackless trolleys that the manufacturers were reluctant to call them as such and termed them "electric coaches" and "trolley buses."

On Sept. 9, 1928, the Utah Light & Traction Company, Salt Lake City, placed ten electric coaches in service on a route 3.45 miles in length, replacing a former street car line. So successful did this original line prove to be, that the management on Dec. 4, 1929, added a second line, 4.74 miles in length, using fifteen additional vehicles.

New Orleans Established Line in 1929

A second recent installation of trolley buses in the United States is that of the New Orleans Public Service, Inc., which started a shuttle route of 1.37 miles in November, 1929, using two vehicles. Knoxville is expected to have the third installation when it opens up a route of approximately 5 miles the latter part of February or early in March, using four electric coaches.

Several other electric railways are considering installations in the near future. Of the pending plans, those of the Chicago Surface Lines to install trackless trolleys on two feeder lines in the northwest part of Chicago stand out as of particular significance. If this company obtains the desired permission to serve this district, it will purchase from 60 to 100 vehicles. Another city, in the South, is also awaiting only a court decision to start an operation of electric coaches.

It was recently announced by the general manager of the Department of Street Railways, Detroit, Mich., that he intended to propose the purchase of a number of trackless trolleys for trial purposes in that city. Should the experiment prove successful, the management plans to extend the use of trackless trolleys. Reports received by this paper from three other large properties and three smaller ones state that they are considering similar installations.

New Equipment Responsible for Renewed Interest

It has long been felt by many operators that the trackless trolley has a definite place in the field of local transportation. Until recently, however, there was a strong feeling that the equipment available was not satisfactory. As a result, only a few of the installations made with earlier equipment are now in operation. Awkward in appearance, hard riding and subject to many mechanical troubles, the early trackless trolley was a very unattractive vehicle. Development of the Versare, Twin Coach and A.C.F. Metropolitan type of buses removed the principal objections to the earlier designs, so far as the riding qualities and arrangement of equipment were concerned. At the same time light-weight, high-speed motors and control suitable for this type of vehicle became available as a result of developments in car design. Further refinements in the collection of current and the overhead removed several other objections.

Seven Railways Now Using Trackless Trolleys

At the present time seven companies are operating trackless trolleys in the United States, its possessions and Canada. These companies are operating 65 vehicles over 27.95 miles of one-way route. When service is started in Knoxville, the operating companies will be increased to eight, the number of vehicles to 69 and the mileage to approximately 33. Cities now operating are Baltimore, Md.; Philadelphia, Pa.; Rochester, N. Y.; Cohoes, N. Y.; Manila, P. I.; Salt Lake City, Utah, and New Orleans, La.

During the year 1929 a total of 20 vehicles were purchased, fourteen by the Utah Light &Traction Company, Salt Lake City; two by the New Orleans Public Service, Inc., and four by the Knoxville Power & Light Company. All of these except those for Knoxville are now in operation. Route extensions for the year totaled 6.11 miles, 1.37 miles of this being accounted for in the new line in New Orleans and 4.74 miles being the second line established by the Utah Light & Traction Company.

Of the seven companies now operating trackless trolleys, the system of the United Railways & Electric Com-

Digitized by Google

pany of Baltimore is the oldest. This line, established in July, 1922, is 6.6 miles in length and uses three vehicles, two of which are in active operation and one of which is held in reserve. They are used in feeder service between the end of a car line and a sparsely settled section in the country, known as Randallstown. Trackless trolleys were selected for this service largely as an experiment and also because of their low cost. Real estate owners in the territory to be served requested that a permanent form of transportation be installed to aid in the development of the section and the company complied with their wishes.

Philadelphia has the second oldest system in the country with a line which was established on Oct. 14, 1923. This route of 2.8 miles serves a rapidly developing industrial and residential district in the southern part of the city. Ten vehicles are used. Need for the immediate service was the reason that prompted the Philadelphia Rapid Transit Company to install the trackless trolley system on a street having steam railroad tracks. These would have required considerable time for removal before electric railway tracks could have been installed. Also, because the district was not yet fully developed, the cost of an electric railway system would have been prohibitive.

Closely following the Philadelphia installation was that of the New York State Railways at Rochester, N. Y. It established a crosstown city service through a densely populated and important industrial section on Nov. 1, 1923. Twelve vehicles are used on the 3.5-mile route. Since the line passes through a densely populated district and crosses five street car lines, the company felt that trackless trolleys would provide the most economical form of transportation.

Belt Car Line Replaced in Cohoes

On Nov. 2, 1924, the Capitol District Transportation Company, a subsidiary of the United Traction Company of Albany, started operation of a 2.53 mile route in Cohoes, N. Y., with four vehicles. The company was faced with a large expenditure for street reconstruction and paving over a considerable part of a belt line, and substituted the electric coaches for this reason. It also selected this form of transportation partly so that it could shorten the distance taken by certain lines in reaching the business center of the city. Reducing the track and paving maintenance costs was also a factor.

Immediate need for reconstructing the street car tracks on one of its lines and the high cost of gasoline in the Philippines caused the Manila Electric Company

Present Trackless Trolley Operations in the U. S., its Possessions and Canada

Company	City	Equipment Number and Type	Present One-Way Mileage	Date Started	Type of Service	Reason for Selection	Remarks
United Railways & Electric Company of Baltimore.	Baltimore, Md.	3 Brill (2 in active operation, 1 held in reserve).	6.60	July, 1922	Feeder service, between end of a car line and Randallstown, a sparsely settled section in the country.	Selected largely as an experiment and because of their low operating cost. Territory was not densely populated but real estate owners desired a permanent form of transportation.	Performance of these trackless trolleys is satisfactory.
Philadelphia Rapid Transit Company.	Philadelphia, Pa.	9 Brill B-3 type, 28 pass. 1 Berg B-4 type, 27 pass. Body by Trackless Trolley Corp.	2.80	Oct. 14, 1923	Crosstown service in south part of city, serving docks and industrial plants in rapidly developing industrial and residential sections.	Because of abandoned steam railroad tracks in street it would have taken too long to substitute street car tracks. Tidewater Docks, employing 2,000, and other plants needed service immediately. Also, territory was not sufficiently developed to warrant investment in tracks.	No supplement or curtailment since original installation. General performance has been quite satisfactory. Gas-electric bus felt to have advantage in flexibility and economy.
New York State Railways.	Rochester, N. Y.	12 Brockways, 25 pass. (Originally 5 had electric motors and 7 gasoline engines. All equipped with motors now.)	3.50 (Originally only 3.00.)	Nov. 1, 1923	Crosstown city service. Connects large industrial and residential sections on either side of a river. Crosses 5 car lines.	Economical operation principal reason.	Company satisfied with their performance.
Capitol District Transportation Company, subsidiary of United Traction Company.	Cohoes, N. Y.	4 Brockway chassis. Wason bodies.	2.53	Nov. 2, 1924	City.	Replaced belt street car line. Company was faced with larger expenditure for street reconstruction along considerable part of line. Change in route brought many residents closer to center of city. Also to reduce track and paving upkeep.	Performance satisfactory.
Manila Electric Company.	Manila, P. I.	8 Twin Coaches, 40 pass.	2.96	April, 1928	Feeder service on heavy traffic street from city limits to two street car lines which are routed to business center of city.	Replaced street cars on a line the tracks of which needed reconstructing. Economy of electric operation as compared to gasoline in Philippines influenced choice of trolley buses.	Giving satisfactory service at low costs, both operating and fixed.
Utah Light & Traction Company	Salt Lake City, Utah.	26-total. 18 Versares. 8-Twin Coaches. (7 Versares of Cincinnati Car Corporation and 7 Twin Coaches added in 1929.)	8.19 total First line 3.45 Second line 4.74	Sept. 9, 1928 Second line Dec. 4, 1929	City service in well built up residential districts and main business district of city.	Necessity of reconstructing and repaving four miles of track. Attendant future paving liabilities. Company believed electric coach to be most economic type of vehicle, at same time offering comfort and speed in a new, attractive vehicle	Company and public so pleased with first line that second was added. Operating costs low. Riding increased.
New Orleans Public Service, Inc.	New Orleans, La.	1 Twin Coach, 40 pass. 1 American Car & Foundry Motors Corp., 42 pass.	1.37	Nov., 1929	Short feeder from industrial plants in Southport, through residential district to a street car line.	Substituted for street car line. Travel too light on line to operate street cars profitably.	Not in service long enough for a report of operation.
Knoxville Power & Light Company.	Knoxville, Tenn.	4 Versares of the Cincinnati Car Corp., ordered.	To be approximately 5 miles.	To start late in Feb. 1930, or early in March.	City.	.....	....

Digitized by Google

to select trolley buses for the replacement of street cars on one of its lines. Although the line is a feeder, it passes through a heavily populated district, so that the company felt trolley buses would be more efficient and provide satisfactory service. Eight Twin Coaches were purchased for use on the 2.96-mile route.

As mentioned previously, the Utah Light & Traction Company placed ten Versare electric coaches in service on a 3.45-mile route in Salt Lake City on Sept. 9, 1928. The necessity of reconstructing and repaving 4 miles of track led to the investigation of the new type of vehicle. It was felt by the management that the electric coach would be the most economical type to use, and that it would also offer attractive, comfortable and speedy service. Operating costs were very low on the new line, and both the company and public were well pleased. As a result, a second line, 4.74 miles in length, was started on Dec. 4, 1929.

Like the first line, this second one serves a well built up residential district and reaches the central business district of the city. Fourteen new vehicles were ordered for the extension, seven Versares of the Cincinnati Car Corporation and seven Twin Coaches. In addition to the ten original coaches the company secured one more Versare and a Twin Coach in 1928, making a total of 12 in operation at the end of 1928 and 26 at the end of 1929.

The line established in November, 1929, by the New Orleans Public Service, Inc., is a short feeder, 1.37 miles in length, connecting several industrial plants with a street car line. Two vehicles were purchased for this service, one a Twin Coach and the other an A.C.F. The vehicles are being operated partly as an experiment, and more may be placed on lines which do not have sufficient patronage to warrant a street car line.

Late in February, 1930, or early in March, the Knoxville Power & Light Company will place four electric coaches in service on a line approximately 5 miles in length. Full details of this installation are not yet available.

Most Abandonments Caused by Poorly Designed Equipment

During the years 1921, 1922 and 1923 eight installations of trackless trolleys were made in the United States and Canada. Of this number only three are still in existence. The cities in which the operations were abandoned were New York, N. Y.; Toronto, Ont.; Minneapolis, Minn.; Windsor, Ont., and Petersburg, Va. Abandonment of earlier installations occurred in Greenwich, Conn., many years ago; in Laurel Canyon, near Los Angeles, Cal., in 1910; and in Merrill, Wis., in 1913. Little information is known about the Greenwich, Conn., installation, which, it is reported, was operated before any electric street cars made their appearance. Likewise, no definite information is available concerning the installation in Laurel Canyon in 1910. Details of all the other abandonments are known, however, and are presented in an accompanying table. It will be noted from the table that in almost every case the operations

Abandoned Trackless Trolley Operations in the U. S. and Canada

Company	City	Date Started	Type of Service	Equipment	Date Abandoned	Reasons for Abandonment	Service Substituted
.....	Greenwich, Conn.	Before trolleys were operated	.....	.....	.....	.....	.....
Pacific Electric Railway...	Laurel Canyon, near Los Angeles, Cal.	1910	.....	.....	.....	.....	.....
Merrill Railway & Light Company.....	Merrill, Wis.	Jan., 1913	City. Reached a ward on west side of city over a bridge, too light and narrow to support a street car line.	One vehicle with a 500-volt motor. Was sold to West End Street Railway, Boston.	Dec., 1913	Proved a failure.	.....
WestEnd Street Railway..	Sconticut Neck, Mass.	1916	.....	One vehicle purchased from Merrill Railway & Light Co.	1916	.....	.....
Staten Island - Midland Railway. Operated by Department of Plant and Structures, City of New York.....	Staten Island, New York, N. Y.	Oct. 8, 1921 System expanded Nov. 4, 1922	Feeders. The two original lines extended from the end of a Richmond trolley line. One, 2.6 miles long, reached a large city hospital, the second, 4.4 miles long, served a settlement called Linoleumville. Third line started in Nov., 1922, extended to Tottenville, a distance of 9 miles.	First installed 8 trolley buses by the Atlas Truck Company with G. E. equipment. 15 Brockways bought for third route.	July 31, 1927	Excessive operating costs. Worn-out equipment. Power company shut off power supply because of large debt.	Buses
Toronto Transportation Commission.....	Toronto, Ont.	Fall, 1921	City	Four	Fall, 1923	Were operated under adverse conditions and were purely experimental.	Buses
Twin City Rapid Transit Company.....	Minneapolis, Minn.	Apr. 15, 1922	City	1 Brill; 1 built by Company.	April, 1923	Operating costs excessive. Trouble with trolley poles and control, due to jarring. Residents objected to overhead. Accidents high. Restricted to fixed route.	.....
Hydro-Electric Railways...	Windsor, Ont.	May, 1922	City	Four	One line, Sept., 1923. Second, May, 1926	First because of track extension. Second, because of inflexibility.	Street cars on first. Buses on second.
Virginia Electric & Power Company. Installation by Virginia Railway & Power Company, its predecessor.....	Petersburg, Va.	June, 1923 Expanded late in 1924	Original line a feeder of 0.8 mile from a residential section to a trolley line. Later extended to business section, replacing street car line. Length 3.5 miles.	Total of five. Two for original installation.	Dec. 31, 1926	Had to pay for and operate on narrow strip of concrete in center of street. Vehicles uncomfortable. Overhead objectionable to residents and expensive to maintain. Operating costs high.	Buses

Digitized by Google

were suspended because of unsatisfactory performance of the equipment. The rapid development of the bus also was responsible for the replacement of some of these lines.

What can probably be called the pioneer trackless trolley installation in the United States and Canada was that of the Merrill Railway & Light Company, Merrill, Wis. E. S. King, president and general manager of the company, had seen a storage battery operated bus of a large department store in Chicago, and conceived the idea of building a similar bus equipped with a 500-volt motor and trolley poles, to serve a ward of the city which required transportation service. This ward was located on the west banks of the Wisconsin River and could not be reached by street car because the bridge joining this section with the main part of the city was too narrow and not strong enough to support heavy equipment. Mr. King planned to extend his trackless trolley operation if it proved successful, but abandoned the line after maintaining service during the year 1913. The vehicle was purchased by the West End Street Railway of Boston, and operated by this company for a short period at Sconticut Neck, Mass.

With much ceremony, the city of New York introduced trackless trolley transportation to the residents of two sections of Staten Island, on Oct. 8, 1921. Two lines were established, both feeding a trolley line. A total of eight trolley buses was used in this service over the 7 miles of route. On Nov. 4, 1922, the city added a third line on Staten Island, extending a distance of 9 miles and using fifteen trolley buses. Operation on all three lines was suspended on July 31, 1927, when the power company cut off its supply to the city, because of a large unpaid debt for energy consumed. The vehicles, however, were worn out and operating costs were so excessive that the city had been negotiating for some time previous for the substitution of buses.

Details of the systems established by the Toronto Transportation Commission, the Twin City Rapid Transit Company, the Hydro-Electric Railways at Windsor and the Virginia Railway & Power Company are given in the accompanying table of abandonments. Unsatisfactory equipment was responsible for most of these failures.

Many Experiments in Early Years

Tests were made by the Virginia Railway & Power Company in June, 1921, of a trolley bus manufactured by the Atlas Truck Company, with General Electric equipment, over a 1-mile route in Richmond. Later in the year the same company experimented with a trolley bus in a residential district of Norfolk. Detroit was the scene of two tests in 1921, one of a trackless trolley with a Brill body, a Packard chassis and Westinghouse equipment, and the other of St. Louis Car Company manufacture. Tests of equipment also were made in the year by the J. G. Brill Company at Philadelphia, the General Electric Company at Schenectady and the St. Louis Car Company at St. Louis. Later, experiments were made in Los Angeles in 1922, in Norfolk during July, 1923, and at Detroit in the summer of 1924. In Norfolk a Brill trackless trolley was run free to demonstrate its practicability. The Detroit tests were to compare two different types of vehicles, one a Brill, with one General Electric motor, and the other a St. Louis Car Company vehicle, with two Westinghouse motors.

It is interesting to note, through the period of these several experiments and installations, the many proposals in other cities for the installation of trackless trolleys. A few of these, selected at random, are: Greenville, Tex., April, 1921; Akron, Ohio, July, 1921; Buffalo, N. Y., August, 1921; Detroit, Mich., August, 1921; Seattle, Wash., September, 1921; St. Louis, Mo., September, 1921; Milwaukee, Wis., January, 1922; Orange, Tex., March, 1923; Toledo, Ohio, January, 1924; Detroit, Mich., April, 1924; and Albany, N. Y., September, 1924.

From the history of installations, abandonments, experiments and proposals, herewith recorded, it is not difficult to trace the cycle through which the trackless trolley has passed since its first inception. Casual experiments previous to 1921 led up to a great period of activity in the two years following. Installations made in the years from 1921 to 1923 were not entirely successful in all the cities where installed and the next few years saw a waning of popularity. During 1927, however, radically different designs of vehicles made their appearance and there followed two important installations, one at Manila, P. I., and one at Salt Lake City, Utah. At present, it appears that the trolley bus is entering upon another period of much activity. Seven companies are now operating this type of vehicle, another will begin in February or March of 1930, and a few others are planning installations in the near future. Upon the activities of the year 1930 will depend, possibly, the outcome of this type of vehicle and whether it will form for itself a definite place in the field of transportation.

Significant Figures of Past Year in Electric Railway Industry

Expenditures for new plant and equipment	**$135,470,000**
Expenditures for maintenance materials	**$100,535,000**
Expenditures for maintenance labor	**$121,450,000**
Number of new cars bought	**1,419**
Mileage of track extensions	**161.71**
Mileage of track reconstruction	**700.14**
Number of new buses bought	**1,813**
Miles of bus route extension	**3,825**

Digitized by Google

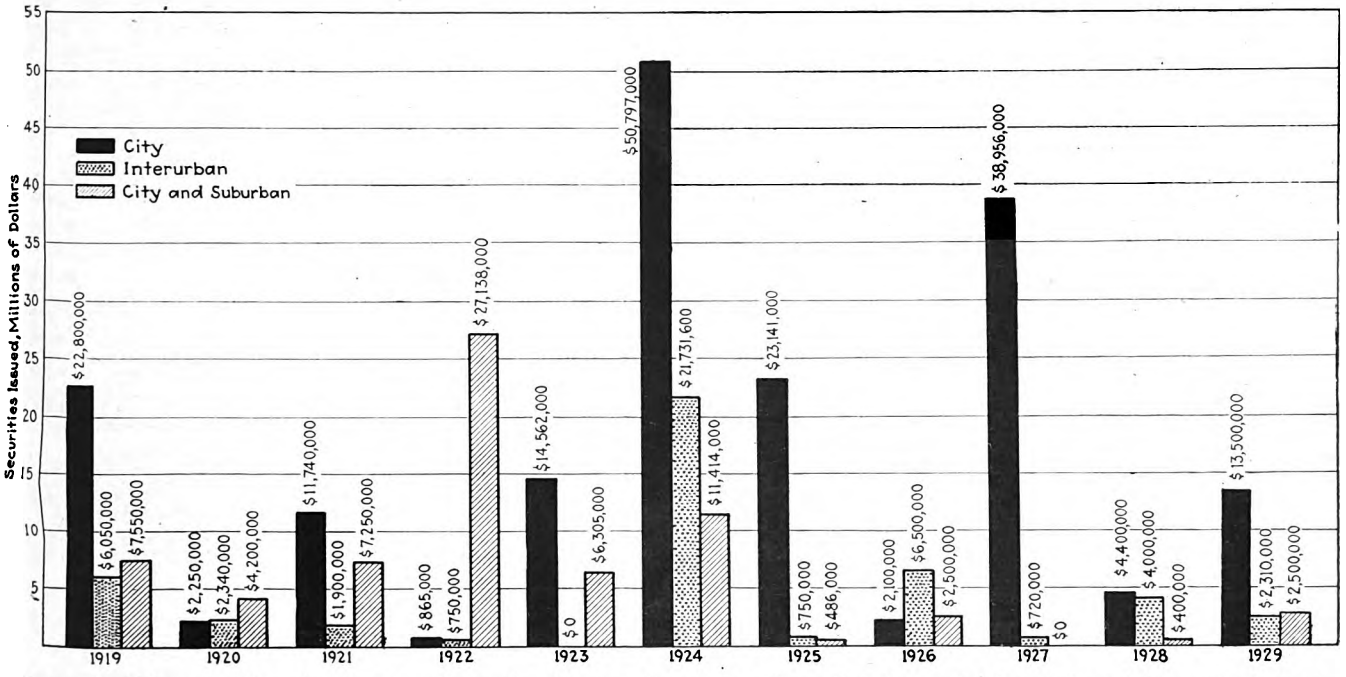
Great Improvement in Financial Situation

With restoration of the industry's credit refunding has been easier in the past year, and maturities are being taken care of on nearly all properties. The receivership status is the most encouraging for any year since the record has been kept by this paper

By

MORRIS BUCK

Engineering Editor *Electric Railway Journal*



The record of financing done by electric railways for the past eleven years shows that the needs of capital are being met adequately

FINANCIALLY speaking, to a greater extent than in any recent year the electric railway industry put its house in order during 1929. Not only was the number of receiverships entered into greatly reduced, but many roads that had been in receivership for a number of years were restored to their owners. Besides this, the total of bonds of electric railway properties in default of interest was reduced almost $40,000,000. Out of a total of $26,668,000 of securities maturing last year, $18,342,000 were retired, and $7,141,000 of bonds, maturing in 22 years or more, were called at prices ranging from 101 to 105. These are the outstanding facts of a record that has not been made by the electric railways for many years, not, in fact, since this paper has been presenting the statistics in its annual reviews.

During the year the major pieces of financing amounted to $18,310,000, as is indicated in Table I. This compares with $8,800,000 in 1928 and $39,676,000 in 1927. By far the largest single transaction in the year was that of the Brooklyn-Manhattan Transit Corporation, which placed an issue of $13,500,000 three-year secured 6½ per cent notes at 98½, or a yield of 7.06 per cent to maturity. The Insull properties placed two issues, one for the South Shore Line and one for the North Shore Line. The South Shore securities were $810,000 of 5½ per cent equipment trust certificates, and the North Shore were $1,500,000 of three-year 6 per cent notes. The latter were placed at 97¾ to yield 6.84 per cent. The other large issue was that of the United Railways & Electric Company of Baltimore. It was divided into two parts, the first being $1,500,000 of first consolidated 4's due in 1949. These bonds, which are part of an issue authorized a number of years ago, were floated at 58. The other issue was $1,000,000 of first and refunding 6½ per cent bonds due in 1957. These were sold at 80. The yields of the two issues were 8.35 per cent and 8.36 per cent respectively.

Digitized by Google

Table I—Eleven-Year Record of New Electric Railway Financing Involving Bond or Note Issues of More Than $400,000

	City Railway	Interurban	City and Suburban
1919	$22,800,000	$6,050,000	$7,550,000
1920	2,250,000	2,340,000	4,200,000
1921	11,740,000	1,900,000	7,250,000
1922	865,000	750,000	27,138,000
1923	14,562,000	.....	6,305,000
1924	50,797,000	21,731,600	11,414,000
1925	23,141,000	750,000	486,000
1926	2,100,000	6,500,000	2,500,000
1927	38,956,000	720,000	0
1928	4,400,000	4,000,000	400,000
1929	13,500,000	2,310,000	2,500,000

Table II—Comparison of Maturities in the Electric Railway Field

1930	$49,274,000	1925	$28,224,000
1929	27,316,600	1924	73,051,600
1928	47,577,200	1923	94,851,800
1927	180,798,000	1922	160,015,860
1926	26,644,790	1921	207,617,530
		1920	80,466,100

They attracted considerable attention at the time they were issued on account of being part of a mortgage authorized a number of years ago, and on account of the ease with which they were absorbed by investors.

The major portion of the financing during the past year was for city railways, principally on account of the inclusion of the Brooklyn issue. On the other hand, the interurban and combination city and suburban properties handled issues totaling approximately the average in these classifications for the past five years. This shows that it still is possible to obtain funds for the two latter classes of properties if the security is good.

In the present year the maturities will be almost double what they were during 1929. The total for 1930 as given in the table is $49,274,000, as compared with $27,316,000. With the improving position of the electric railways in the eyes of the investing public little difficulty should be involved in the refunding. No very large individual amounts are included, the largest items being the Louisville Railway consolidated 5's, $6,000,000, due in July; Newark Passenger Railway consolidated 5's, $5,849,000, also due in July, and Portland Railway, of Portland, Ore., refunding 5's, $5,870,000, due in November.

Table IV—Principal Electric Railway Maturities in 1930

(Based on Dow, Jones & Company Compilation)

	Security	Rate	Amount
January			**$2,079,000**
Syracuse Rapid Transit Co	2nd	5	654,000
Topeka Railway	1st	5	622,000
Albany Railway	Cons.	5	428,000
Brooklyn City Railroad	Eq.Tr.A	5	375,000
February			**$3,937,500**
Chicago, North Shore & Milwaukee R.R	3-Yr.	5½	2,500,000
Hammond, Whiting & East Chicago Ry	1st	5	1,000,000
Philadelphia Rapid Transit Co	Eq.Tr.G	5½	237,500
Pittsburgh Railways	Eq.Tr.	6	200,000
March			**$2,900,000**
United Railways & Electric Co. of Baltimore	3-Yr.	6	2,500,000
Berkshire Street Railway	Deb.	5	200,000
Empire Passenger Railway	1st	3½	200,000
April			**$2,179,000**
Rochester Railway	Cons.	5	2,179,000
May			**$3,332,000**
Duluth Street Railway	1st	5	2,500,000
Duluth Street Railway	Gen.	5	832,000
June			**$2,770,000**
City & Suburban Railway	1st	4	1,290,000
Detroit United Railway	Serial	6	500,000
Doylestown & Willow Grove Railway	1st	4	500,000
Pasadena & Mt. Lowe Railway	1st	4	480,000
July			**$15,641,000**
Louisville Railway	Cons.	5	6,000,000
Newark Passenger Railway	Cons.	5	5,849,000
West End Street Railway	Deb.	4½	1,604,000
Duquesne Traction Company	1st	5	1,313,000
West Liberty Street Railway	1st	5	400,000
Allentown & Kutztown Traction Co	1st	5	250,000
Atlanta Street Railroad	1st	6	225,000
August			**$5,542,500**
Worcester Consolidated Street Railway	Ref.	6½	2,116,000
Worcester Consolidated Street Railway	Ref.	4½	1,489,000
Worcester Consolidated Street Railway	Deb.	6	1,200,000
Worcester & Southbridge Street Railway	1st	6	500,000
Philadelphia Rapid Transit Company	Eq.Tr.G	5½	237,500
September			**$2,493,000**
Hartford Street Railway	1st	4	2,493,000
October			**$1,346,000**
Pittsburgh, Allegheny & Manchester Traction Co.	1st	5	1,346,000
November			**$6,284,000**
Portland (Ore.) Railway	Ref.	5	5,870,000
Sioux Falls Traction Company	1st	6	414,000
December			**$770,000**
Detroit United Railway	Serial	6	500,000
Philadelphia Rapid Transit Company	Eq.Tr.H	5½	270,000
Total for 1930			**$49,274,000**

In the matter of securities defaulted, the year has shown a remarkable improvement. At the beginning of 1929 the total of such securities was $262,953,875. At the close of the year there were only $223,672,275 of

Table III—Disposition of Electric Railway Maturities in 1929

Company and Issue	Amount	Disposition
January	**$1,449,000**	
Interborough Rapid Transit Co. ctfs	$450,000	Retired
New Bedford, Middleboro & Brockton St. Ry. 1st	324,000	Retired
Eastern Massachusetts St. Ry. refunding	300,000	Retired
Brooklyn City Railroad equipment trust	375,000	Retired
February	**$768,500**	
South Shore & Boston St. Ry., 1st	$331,000	Retired
Philadelphia Rapid Transit Co., equip. trust G	237,500	Retired
Pittsburgh Railways, equipment trust	200,000	No data
May	**$328,000**	
Marion City Railway, 1st	$328,000	None
June	**$250,000**	
East Side Traction Co., 1st	$250,000	Retired
July	**$1,398,000**	
Lebanon Valley St. Railway, 1st	$500,000	None
Erie Traction Co., 1st	353,000	Retired
Central Traction Co., 1st	325,000	Extended
LaCrosse City Railway, 1st	220,000	Refunded
August	**$11,028,500**	
Atlantic & Suburban Railway, 1st	$591,100	No data
Philadelphia Rapid Transit Co., equipment trust G	237,500	Retired
Aroostook Valley Railroad, 1st	200,000	Retired
Brooklyn-Manhattan Transit Co., 1 yr	10,000,000	Retired
September	**$2,714,000**	
Wilkinsburgh & East Pittsburgh Ry., 1st	$1,989,000	Extended
Terre Haute, Indianapolis & Eastern Traction Co., clt.	425,000	Retired
Hoosac Valley Street Railway, refunding	300,000	Extended

Company and Issue	Amount	Disposition
November	**$3,570,000**	
Baltimore Traction Co., 1st	$1,500,000	Retired
Pittsburgh & Birmingham Traction Co., 1st	1,500,000	Extended
Interborough Rapid Transit Co., ctfs. C	570,000	Retired
December	**$5,162,000**	
Lynn & Boston Railroad, 1st	$2,519,000	Retired
St. Louis Electric Terminal Railway, 1st	1,724,000	Extended
Johnstown Passenger Railway, consolidated	399,000	Renewed
East McKeesport Street Railway, 1st	250,000	Extended
Philadelphia Rapid Transit Co., equipment trust H	270,000	Retired

Summary of Dispositions by Months

Month	Retired	Refunded	Extended	No Disposition	Unknown
January	$1,449,000	.....	.....	.....	.....
February	568,500	.....	.....	.....	$200,000
March	.....	.....	.....	.....	.....
April	.....	.....	.....	.....	.....
May	.....	.....	.....	$328,000	.....
June	250,000	.....	.....	.....	.....
July	353,000	$220,000	$325,000	500,000	.....
August	10,437,500	.....	.....	.....	591,100
September	425,000	.....	2,289,000	.....	.....
October	.....	.....	.....	.....	.....
November	2,070,000	.....	1,500,000	.....	.....
December	2,789,000	.....	2,373,000	.....	.....
Total	$18,342,000	$220,000	$6,487,000	$828,000	$791,100
	Grand total			$26,668,000	

Digitized by Google

Table V—New Bond and Note Financing in 1929 Offered Publicly in Amounts of More Than $250,000

Issue	Price	Maturity	Yield	Amount
Chicago, South Shore & South Bend R.R. Equipment Trust C 5½'s	.....	1930–39	....	$810,000
Brooklyn-Manhattan Transit Corporation 3-yr. secured notes, 6½'s	98.50	1932	7.06	13,500,000
Chicago, North Shore & Milwaukee R.R. 3-yr. notes, 6's	97.75	1932	6.84	1,500,000
United Railways & Electric Co. of Baltimore 1st consolidated 4's	58.00	1949	8.35	1,500,000
United Railways & Electric Co. of Baltimore 1st and refunding 6½'s	80.00	1957	8.36	1,000,000
Total	.....	.....	....	$18,310,000

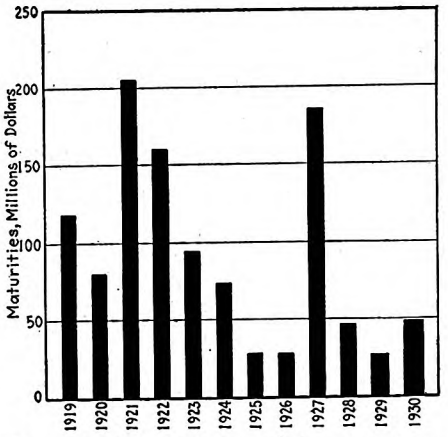
Table VI—Electric Railway Securities Called in 1929

Month	Company	Mature	Amount	Price
February	Wilmington & Philadelphia Traction Co. 5's	1963	$5,041,000	105
March	Cleveland, Elyria & Western Ry. 6's.	1954	1,073,000	101
March	Wilmington City Ry. 1st 5's	1951	600,000	105
March	Cleveland & Elyria Div. 6's	1954	200,000	101
March	Cleveland, Berea, Elyria & Oberlin 6's	1954	127,000	101
March	Cleveland & Oberlin Div. 6's	1954	100,000	101

Table VII—Electric Railway Receiverships—1929

	Miles of Single Track Involved	Capital Stock	Funded Debt	Receiver's Certificates
Hammond, Whiting & East Chicago Ry., Hammond, Ind.	34.16	$1,000,000	$1,788,000	None
New York State Railways, Rochester, N. Y.	254.14	23,814,900	26,087,000	None
United Traction Co., Albany, N. Y.	112.10	12,500,000	6,500,000	None
Oklahoma Union Railway, Tulsa, Okla.	18.9	$1,500,000	$750,000	None
Sunbury & Selinsgrove Railway, Selinsgrove, Pa.	6.2	220,100	13,400	None
Total for 1929	425.50	$39,035,000	$35,138,400	None

bonds in default. The situation is the more encouraging when it is seen that included in these totals are items of $156,169,475 of bonds of the Chicago Surface Lines constituent companies, defaulted on account of the unsatisfactory political situation which prevented a renewal of the operating franchises early in 1927. As a result it was not possible to refinance and the bonds are technically in default, although interest is being paid regularly on them, and the principal undoubtedly will be paid off or refunded as soon as an agreement with the city is reached. Apart from these securities the total of defaulted bonds a year ago was $106,784,400. At the end of the year just closed the amount had been reduced to $67,602,800. In other words, more than a third of the issues in default, except for Chicago, had been adjusted. This excellent record speaks well for the soundness of the industry.

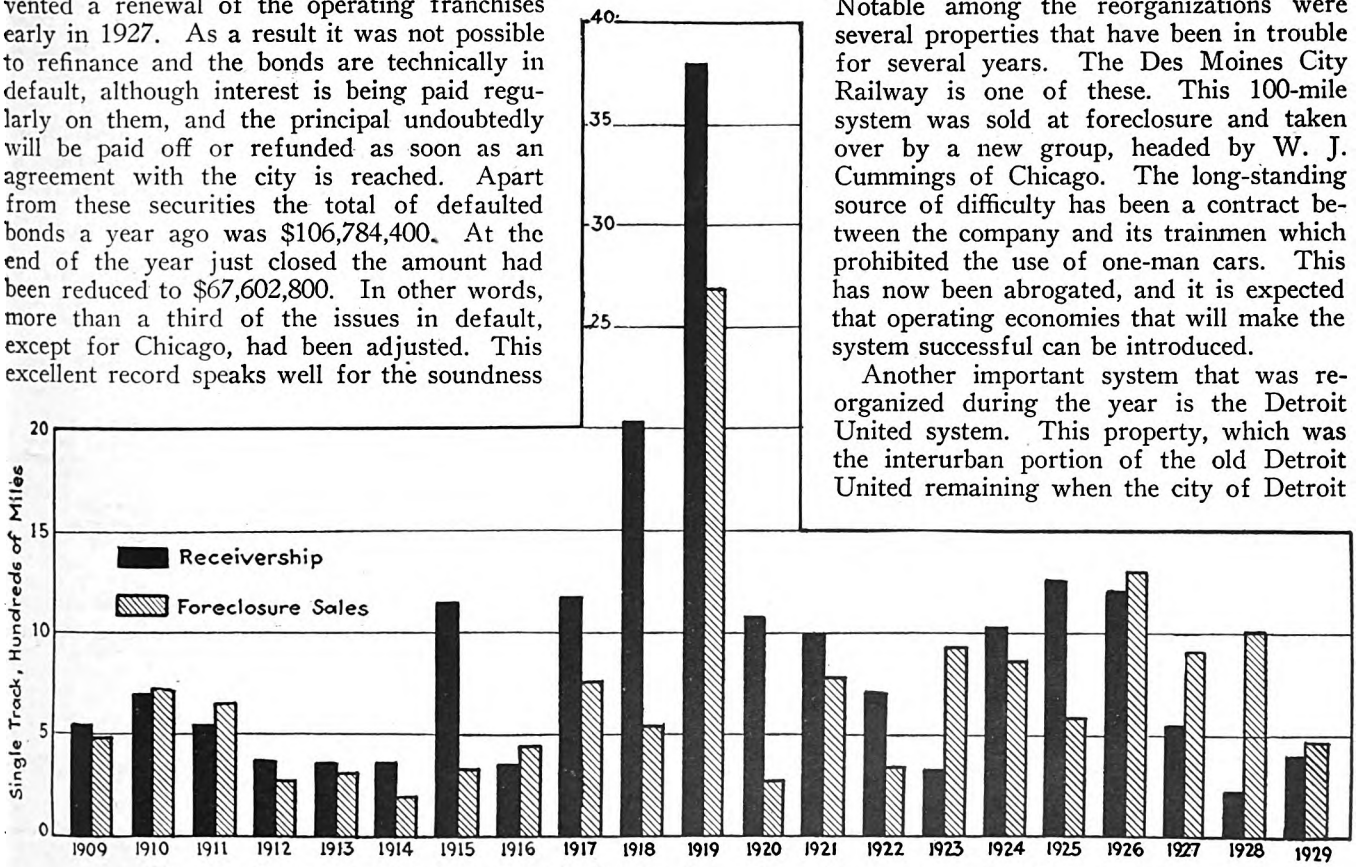


Maturities for 1930 show an increase above last year, but are relatively small in the aggregate

The receivership record of 1929 would be good at any time, but is particularly noteworthy after the record of the past twenty years. When conditions in the industry were normal, in the five years before the World War began, the receiverships averaged nineteen per year, with an average of 500 miles of track each year, and with securities averaging $24,700,000 in stock and $39,000,000 in bonds. As the war progressed the situation became worse, the 1919 record reaching the tremendous figure of 48 roads with 3,781 miles of track thrown into receivership, involving $321,000,000 of stocks and $312,900,000 of bonds. From that point the receiverships diminished gradually until only eight roads became involved in 1928. But the record for last year, when only five roads with a total of 510 miles of track, and with $18,473,000 of stocks and $21,173,700 of bonds went into the hands of receivers, is the best since 1925. It is also noteworthy that one of these roads was able to satisfy its creditors and the arrangements for ending the receivership were made during the year.

There also has been a material reduction in the number and importance of roads remaining insolvent. Notable among the reorganizations were several properties that have been in trouble for several years. The Des Moines City Railway is one of these. This 100-mile system was sold at foreclosure and taken over by a new group, headed by W. J. Cummings of Chicago. The long-standing source of difficulty has been a contract between the company and its trainmen which prohibited the use of one-man cars. This has now been abrogated, and it is expected that operating economies that will make the system successful can be introduced.

Another important system that was reorganized during the year is the Detroit United system. This property, which was the interurban portion of the old Detroit United remaining when the city of Detroit



The great improvement in the receivership situation is seen from this record covering the past 21 years

Digitized by Google

Table VIII—Outstanding Electric Railway Bonds in Default of Interest

(Based on Compilation by Dow, Jones & Company)

	Amount	Defaulted	
Auburn & Syracuse Electric R.R. ref. 5's	$1,752,000	April,	1926
Bethlehem & Nazareth Railway 5's, 1929	150,000	May,	1929
Bloomfield Street Railway 5's, 1923	250,000	Aug.,	1923
Brownsville Avenue Street Railway 5's, 1926	300,000	Aug.,	1926
Buffalo & Erie Railway 1st 6½'s	994,000	July,	1925
Buffalo & Lackawanna Traction Company 5's, 1928	1,000,000	Dec.,	1918
Calumet & South Chicago Railway 5's, 1927	5,532,000	Feb.,	1927
Central Passenger Railway 6's, 1924	125,000	Oct.,	1924
Chatham, Wallaceburg & Lake Erie 6's, 1925	800,000	July,	1925
Chicago City & Connecting Railways 5's, 1927	20,616,000	Jan.,	1927
Chicago City Railway 1st 5's, 1927	33,926,000	Feb.,	1927
Chicago Railways 1st 5's, 1927	55,655,000	Feb.,	1927
Cons. A 5's, 1927	16,703,800	Feb.,	1927
Cons. B 5's, 1927	17,164,475	Feb.,	1927
Purch. money 5's, 1927	4,073,000	Feb.,	1927
Adj. income 4's, 1927	2,500,000	Feb.,	1927
Citizens Traction Company 1st 5's, 1927	246,000	Oct.,	1927
Clinton Street Railway 1st 5's, 1926	400,000	April,	1926
Detroit, Jackson & Chicago Railway 5's	881,000	Aug.,	1925
Evansville & Ohio Valley Railway 5's	1,034,200	Jan.,	1928
Inter-Urban Railway 1st 7½'s	562,500	April,	1927
Inter-Urban debenture 6's	250,000	Jan.,	1923
Kansas-Oklahoma Traction Company 6's	234,000	Nov.,	1924
Key System Securities Company coll. 6's	2,500,000	July,	1929
Lakeside Railway 1st 6's	150,000	Nov.,	1927
Lebanon Valley Street Railway 5's, 1929	500,000	July,	1929
Lowell & Fitchburg Street Railway 5's, 1926	275,000	Jan.,	1926
Millvale, Etna & Sharon Street Railway 5's, 1923	741,000	Nov.,	1923
Monongahela Street Railway 5's, 1928	993,000	June,	1928
New York & Queens County Railway 4's	1,300,000	April,	1922
New York State Railways cons. A 4½'s	13,457,000	Nov.,	1929
New York State Railways cons. B 6½'s	3,000,000	Nov.,	1929
Ogdensburg Street Railway 6's, 1925	150,000	Sept.,	1925
Penn Street Railway 1st 5's, 1922	250,000	June,	1922
Pittsburgh & Birmingham Traction Co. 5's, 1929	1,500,000	Nov.,	1929
Pittsburgh, Crafton & Mansfield 5's, 1924	171,000	July,	1924
Pittsburgh Traction Company 5's 1927	666,000	Oct.,	1927
Pittsburgh & West End Passenger Railway 5's, 1922	313,000	July,	1922
Puget Sound Electric Railway cons. 5's	2,427,000	Aug.,	1927
Rochester & Syracuse Railroad 5's	2,448,500	May,	1927
Salt Lake & Utah Railroad 1st 6's	1,431,900	Oct.,	1925
Salt Lake & Utah Railroad conv. 7's, 1928	150,000	Oct.,	1925
Seattle & Rainier Valley Railway 6's	484,000	Jan.,	1928
Seattle & Rainier Valley Railway general 5's	577,500	Jan.,	1928
Southwest Missouri Electric Company 6's, 1928	909,000	Sept.,	1926
Southwest Missouri Railroad 5's	1,034,000	Sept.,	1926
Springfield Railway 1st 5's	1,335,400	March,	1928
Steinway Railway 6's, 1922	1,500,000	July,	1922
Syracuse, Lake Shore & Northern Railroad 5's	2,496,000	May,	1927
Union Traction Company, Coffeyville, Kansas 5's	941,000	Jan.,	1925
Union Traction Company of Indiana gen. 6's	4,623,000	Jan.,	1925
Washington Electric Street Railway 5's, 1927	125,000	Feb.,	1927
Waterloo Cedar Falls & Northern 5's	5,773,000	Jan.,	1922
Webb City Northern Electric Railroad 6's, 1928	125,000	Sept.,	1926
Wilkes-Barre & Hazelton Railway 1st 5's	1,761,000	May,	1929
Wilkes-Barre & Hazelton 2nd coll. 5's	1,227,000	April,	1929
Wilkinsburg & East Pittsburgh 5's, 1929	1,989,000	Sept.,	1929
Youngstown & Ohio River Railroad 1st 5's	1,200,000	April,	1927
Total	$223,672,275		

Table IX—Record of Electric Railway Receiverships

Year	Number of Companies	Miles of Single Track Involved	Outstanding Securities—Stocks	Outstanding Securities—Bonds
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	321,259,354	312,915,104
1920	19	1,065.31	28,758,455	72,283,575
1921	19	986.42	32,909,525	36,177,800
1922	14	695.43	18,140,150	20,304,400
1923	12	333.63	8,332,100	14,707,066
1924	12	1,021.88	28,489,700	35,716,000
1925	14	1,260.07	51,383,195	54,696,525
1926	16	1,228.28	17,769,435	117,560,073
1927	13	624.32	17,615,050	20,875,450
1928	8	261.95	9,216,700	14,790,700
1929	5	425.50	39,035,000	35,138,400

Table X—Record of Electric Railway Foreclosure Sales

Year	Number of Companies	Miles of Track Involved	Outstanding Securities—Stocks	Outstanding Securities—Bonds	Outstanding Securities—Receivers' Certificates
1909	21	488.00	$22,265,700	$21,174,000	(a)
1910	22	724.36	19,106,613	26,374,075	(a)
1911	25	660.72	91,354,800	115,092,750	(a)
1912	18	267.18	14,197,300	10,685,250	(a)
1913	17	302.28	15,243,700	19,094,500	(a)
1914	11	181.26	26,239,700	44,094,241	(a)
1915	19	308.31	30,508,817	16,759,997	(a)
1916	19	430.14	13,895,400	22,702,300	(a)
1917	26	745.19	27,281,900	27,313,045	(a)
1918	23	524.22	37,740,325	20,149,384	(a)
1919	29	2,675.48	89,893,400	79,836,738	$42,300
1920	13	259.90	7,782,400	11,227,328	52,000
1921	13	777.97	33,642,255	30,863,526	5,000
1922	13	322.88	7,491,500	12,640,600	14,683
1923	15	927.45	118,077,959	110,638,250	12,265,000
1924	14	869.25	21,022,800	34,845,535	3,440,388
1925	13	569.39	18,074,300	18,329,555	53,000
1926	28	1,291.17	20,054,700	57,340,363	214,000
1927	16	940.68	53,345,000	78,445,100	3,140,000
1928	8	1,003.73	26,084,325	40,683,400	168,150
1929	10	510.38	18,472,995	21,173,700	285,359

(a) Data not available.

purchased the city lines, finally was able to work out a plan for satisfying its creditors. It now has been reorganized as the Eastern Michigan Railways. Incidentally, this was the largest road remaining in receivership at the beginning of last year, comprising 613.9 miles of track and involving $45,000,000 of securities.

The Indiana, Columbus & Eastern Traction Company, which went into receivership in 1921, finally adjusted its difficulties and was merged with the Cincinnati, Hamilton & Dayton Railway. The plan was worked out in 1928, but was not consummated until last year.

With these roads and a number of others out of

Table XI—Receiverships Terminated and Foreclosure Sales During 1929

Receivers Discharged with or without Foreclosure Sales or Following Abandonment	Miles of Single Track Involved	Capital Stock	Funded Debt	Receiver's Certificates	
Indianapolis & Cincinnati Traction Co., Indianapolis, Ind.	101.00	$3,600,000	$2,600,000	156,000	Sold at receiver's sale in 1928. Receiver disharged.
Milford & Uxbridge Street Ry., Milford, Mass.	35.00	540,000	500,000	None	Sold at foreclosure in 1927. Receiver discharged March, 1929.
Wahpeton-Breckenridge Street Ry., Breckenridge, Minn.	1.00	42,500	None	None	Receivership lifted.
Atlantic & Suburban Ry., Atlantic City, N. J.	16.00	150,000	691,000	None	Sold at foreclosure. Road sold for scrap.
Missouri & Kansas Ry., Kansas City, Kansas	20.03	1,000,000	655,000	None	Sold at foreclosure and receiver discharged.
Joplin & Pittsburgh Ry., Pittsburgh, Kansas	94.52	7,000,000	3,078,500	None	Sold at foreclosure; now operated by Joplin & Pittsburgh R. R.
Manhattan & Queens Traction Corp., Long Island City, N. Y.	20.11	20,000	None	None	Reorganized and receiver discharged.
Ogdensburg Street Ry., Odgensburg, N. Y.	4.23	150,000	150,000	None	Receivership lifted April 13, 1929.
Westchester Street R. R., New York, N. Y.	17.68	700,000	168,000	None	Sold at foreclosure in 1927 and receivership lfited September, 1929
Tulsa Street Ry., Tulsa, Okla.	23.00	800,000	None	None	Sold at foreclosure, and reorganised as the United Service Company. Receiver discharged.
Total of receiverships terminated (nine companies)	332.57	$14,002,500	$7,842,500	156,000	
Sold at Foreclosure Sale But Receiver Not Yet Discharged					
Des Moines City Ry., Des Moines, Iowa	103.10	$3,019,100	$4,821,000	None	Sold at receiver's sale.
Hammond, Whiting and East Chicago Ry., Hammond, Ind.	34.16	1,000,000	1,788,000	None	Sold at foreclosure sale.
Binghamton Ry., Binghamton, N. Y.	47.31	978,895	2,877,200	None	Sold at foreclosure and reorganised as the Triple Cities Traction Company.
Ithaca Traction Corp., Ithaca, N. Y.	12.72	400,000	763,000	25,000	Sold at receiver's sale.
Indiana, Columbus & Eastern Traction Co., Springfield, Ohio.	153.23	4,025,000	6,400,000	260,359	Sold at receiver's sale.
Lawton Railway & Light Co., Lawton, Okla.	6.31	100,000	100,000	None	Sold at receiver's sale and company out of existence.
Total foreclosure sales, receiver not discharged (six companies)	356.83	$9,522,995	$16,749,200	285,359	

Digitized by Google

receivership, the record has been greatly improved. Apart from the New York State properties, which were taken over by the courts on Dec. 30, the only system of any size remaining in receivership is the Union Traction Company of Indiana. With 445.5 miles of track and $27,300,000 of securities involved, it represents a large item in the total of receiverships at the end of the year. Various plans have been proposed for its reorganization, but up to date none of them has been accepted.

One of the most searching analyses of an industry ever made was that conducted recently for the Investment Bankers Association by its public service securities committee, and just released by the association. In general it believes in the inherent soundness of this class of properties, although it issues a warning against over-inflation of prices of some of the holding companies. On the specific subject of electric railway properties the report in part is as follows:

The street railway industry is laboring to recover its former position of prestige, to which the community benefits it confers entitle it. When the source of income of an industry is not increasing—is, in fact, too frequently decreasing—it cannot raise needed capital advantageously, and the market position of its securities suffers accordingly. Increase in fares and reduction in operating expenses have their limits; and net earnings dependent for their increase on such factors spell sooner or later an unsuccessful business. All this is unfortunate, for the street railway is an indispensable service, especially in large communities. It behooves the owner of street railway securities, and the would-be investor in them, to gage if possible the reasons for the existing situation and the possible remedies for it.

Unless the public is to take over these operations (which your committee believes to be a wrong policy to pursue), and tax the whole community for such service as it elects to give, it must change its attitude toward the street railway and recognize it as a public servant conferring definite and large community benefits, and relieve it of inequitable financing burdens. Why should a street railway pay large paving costs, and snow removal costs, for general public advantage? Why should not subway and similar costs be borne by the benefited property, as are other street improvements, for a subway is nothing but street extension? It is the fair cost of service that the car rider should pay, under careful public regulation, and not a 5-cent fare specified in some antiquated franchise, under which a service essential to public welfare cannot survive. And the public must recognize that monopoly of all the facilities of transportation under public regulation will confer wider community benefits than can a continuation of destructive competition.

On the other hand, the industry has grave responsibilities. A new point of view must be developed, both as to equipment and operating methods. Evolution in these respects has been astonishingly slow. The whole subject must be thought of in new terms. First, income must be increased—more passengers must use street cars. Present equipment is for the most part an anachronism. Cars must be made attractive, light weight, noiseless, easy to board and leave. Public taste and convenience must be catered to. This done, the great advantage of the street car rolling on a fixed track over any form of free-moving bus, in transporting multitudes of people, should make itself apparent. To all of this the American Electric Railway Association is abundantly alive, and at its convention just held in Atlantic City there was much evidence of progress in equipment—new design of cars, differential drive, worm gears and numberless devices to make the street car more attractive to passengers and the public both in appearance and performance. These efforts, the gradual restrictions on parking privileges in congested districts, and the co-ordination of the various transportation services should mean a recovery in the street railway industry.

The significance of the abandonment of track has been overestimated. Most of this has been normal; some, of course, has been forced by competition. Interurban roads particularly have suffered, as was to have been expected when the motor car appeared. Street railways are local urban enterprises and each must be studied and estimated in the light of the peculiar problems surrounding it. In some instances the investment possibilities of the securities of individual properties have not been recognized because of too

Table XII—Electric Railway Receiverships as of Dec. 31, 1929

	Year of Receiver-ship	Miles of Single Track	Capital Stock	Funded Debt	Receiver's Certificates
Illinois					
Chicago Railways, Chicago	1926	597.06	$100,000	$103,854,255	None
Peoria Railway Terminal Co., Peoria (1)	1922	25.28	$1,000,000	2,444,000	None
Indiana					
Chicago, South Bend & Northern Indiana Ry., South Bend	1927	125.00	7,500,000	4,955,500	None
Evansville & Ohio Valley Ry., Evansville	1927	42.85	>11,985	1,960,900	None
Hammond, Whiting & East Chicago Ry., Hammond, Ind. (11)	1929	34.16	1,000,000	1,788,000	None
Southern Michigan Railway, South Bend	1928	36.50	2,000,000	1,145,000	None
Union Traction Co. of Indiana, Anderson	1924	451.67	11,500,000	15,848,000	None
Iowa					
Des Moines City Ry., Des Moines (9)	1927	103.10	3,019,100	4,821,000	None
Mississippi Valley Electric Co., Iowa City	1926	6.00	538,420	148,000	None
Kansas					
Union Traction Co., Coffeyville	1927	85.00	700,000	1,150,000	None
Kentucky					
Owensboro City R. R., Owensboro	1923	11.95	75,000	400,000	None
Michigan					
Detroit & Port Huron Shore Line Ry., Detroit (8)	1925	125.00	2,000,000	2,500,000	None
Houghton County Traction Co., Houghton	1921	32.15	957,200	660,000	None
Michigan Railroad, Jackson (2)	1924	156.71	4,000,000	4,050,000	None
Minnesota					
Minneapolis, Anoka & Cuyuna Range Ry., Minneapolis	1926	29.25	300,000	284,000	None
St. Paul Southern Electric Ry., Hastings (7)	1918	17.54	658,225	364,900	12,900
Missouri					
Hannibal Railway & Electric Co., Hannibal	1927	6.50	111,165	102,500	None
Southwest Missouri R. R., Webb City	1926	90.00	5,000,000	2,341,000	None
New York					
Auburn & Northern Electric R. R., Syracuse	1928	(a)	(b)	236,000	None
Binghamton Ry., Binghamton (3)	1925	47.31	978,895	2,877,200	None
Buffalo & Erie Ry., Fredonia	1928	95.56	1,450,500	910,300	None
Buffalo & Lackawanna Traction Co., Buffalo	1918	8.80	55,000	1,000,000	None
Eighth and Ninth Avenues Ry., New York	1927	37.84	116,000*	None	None
Empire State R. R., Syracuse	1927	76.31	2,950,000	2,750,000	None
Hamburg Ry., Buffalo	1920	21.72	None	750,000	4,000
Ithaca Traction Corp., Ithaca (10)	1924	12.72	400,000	763,000	25,000
New York & Queens County Ry., Jackson Heights	1923	34.94	3,235,000	1,300,000	None
New York State Rys., Rochester, N. Y.	1929	254.14	23,814,900	26,087,000	None
Second Avenue R. R., New York (4)	1908	23.96	1,600,000	None	None
Staten Island Midland Ry., Brooklyn	1920	28.68	1,000,000	1,000,000	3,000
Steinway Ry., New York	1922	31.11	None	1,500,000	None
Syracuse, Lake Shore & Northern Ry., Syracuse	1928	(a)	(b)	2,496,000	None
United Traction Co., Albany, N. Y.	1929	112.10	12,500,000	6,500,000	None
Ohio					
Indiana, Columbus & Eastern Traction Co., Springfield (5)	1921	153.25	4,025,000	6,400,000	260,359
Springfield Ry., Springfield	1928	40.54	1,500,000	1,335,400	None
Oklahoma					
Lawton Railway & Light Co., Lawton (6)	1927	6.31	100,000	100,000	None
Oklahoma Union Railway, Tulsa	1929	18.90	1,500,000	750,000	None
Pennsylvania					
Schuylkill Ry., Girardville	1927	34.00	400,000	1,550,000	None
Sunbury & Selinsgrove Ry., Selinsgrove	1929	6.20	220,100	13,400	None
Utah					
Salt Lake & Utah R. R., Salt Lake City	1925	97.55	5,043,700	2,532,320	200,000
Washington					
Puget Sound Electric Ry., Tacoma	1928	57.10	3,116,200	7,322,000	None
Net receiverships Dec. 31, 1929	....	3,142.61	104,860,390	216,989,675	$505,259

(a) Included with Empire State R. R. figures.
(b) Information not available.
(1) Sold at foreclosure in 1927. Receiver not yet discharged.
(2) Sold at receiver's sale 1928. Receiver not yet discharged.
(3) Sold at foreclosure and reorganized as Triple Cities Traction Co.
(4) Reorganized as Second Avenue Railroad Corp. Receiver not yet discharged.
(5) Sold at receiver's sale. Receiver not yet discharged.
(6) Sold at receiver's sale. Receiver not yet discharged. Company out of existence.
(7) Sold at public auction in 1928. Receiver not yet discharged.
(8) This is the only subsidiary company of the Detroit United Ry. now operating under receivership. The Detroit, Jackson & Chicago Ry. has discontinued service and the Detroit United Ry. and the Detroit, Monroe and Toledo R. R. were sold at foreclosure and reorganized as the Eastern Michigan Rys.
(9) Sold at receiver's sale. Receiver not yet discharged.
(10) Sold at receiver's sale. Now operated by Ithaca Ry. Co., but receiver not yet discharged.
(11) Sold at foreclosure sale. Receiver not yet discharged.
*58,000 shares. No par value. Based on market quotation.

Digitized by Google

broad generalizations, though what has already been said seems too germane to the industry as a whole to be overlooked.

The aggregate figures of investment and income for the industry are impressive. They show an industry that must survive in the public interest. The new brains in the industry, looking ahead and discarding the past, will accomplish much, and may accomplish a revolution in the business if they be given time and support.

On the other hand, some unfavorable comment has been heard concerning the financial status of the industry. Only recently a spokesman for one of the investment services warned against the purchase of electric railway bonds. His words were widely circulated. They should be taken *cum grano salis,* but they certainly did not help the situation. In an appeal to bondholders of the New York State Railways and other properties for the conversion of their securities, H. C. Hopson, president of the Associated Gas & Electric Company, made a number of statements which are not reassuring to present holders and can have only a bad effect on any prospective purchasers of railway securities. The situation on the properties in New York State has been acute for some time, and culminated in their receivership a few days ago. But to generalize about the railway financial situation as a whole from the status of these companies is entirely unjustified.

As the Investment Bankers Association points out, the street railway is a much more essential service than one might be led to believe if he were to accept at face value all that the adverse commentators have said about it. Too often, far too often, the railways have been made the football of politics. This is Mr. Insull's comment in his recent penetrating remarks about Chicago. Companies with which he is identified have made a financial success not only in interurban operation, but in operation in the more moderate sized cities, the ones in which it is held that successful operation is most difficult. Not even the committee on electric railway financing of the A.E.R.A., which reported several years ago after an extended investigation, sought to mitigate the condition which exists of a need for recasting of financial structures of many properties. It is regrettable that more companies have not followed out these recommendations, but the comments of Mr. Hopson and others may properly be characterized as representing the extreme point of view. It is more nearly true, as Mr. Insull said of the Chicago situation, that with proper set-up of the financial plan, founded on true economic principles, money necessary will pour in from securities, both senior and junior—bonds, preferred and common stock.

Much Construction Work Features Heavy Electric Traction in 1929

CONSTRUCTION work on projects already authorized occupied the major attention of electrification engineers during the year just past. The conversion has continued at a rate foreshadowed by the announcements made public during 1928. While comparatively little track was opened to electric operation during the year, the present year will witness the fulfillment of many of the projects under way.

Chief among the installations being made is that of the Pennsylvania Railroad, which is actively at work on extension of its electric system to cover the territory between New York and Washington. The section between Philadelphia and Wilmington is now using electric power for local service over 52.6 miles of route. The sections comprising the line between Philadelphia and New York will follow next. The obstacle to electrification of the line between Wilmington and Washington, the series of tunnels in Baltimore, has now been removed by the action of the city to permit the construction of new tunnels to supplement the present ones. In all a total of 325 miles of route and 1,300 miles of track has been authorized. Following the completion of the New York-Washington line, it is rumored that the Pennsylvania will proceed at once with preparations for the electrification of the route over the Allegheny Mountains between Philadelphia and Pittsburgh, a project which has been considered for years.

The Cleveland Union Terminal Company has virtually completed the equipment of the new terminal at the Public Square in Cleveland and the approaches of the several roads entering it, so that electric operation will begin in the immediate future.

The Delaware, Lackawanna & Western Railroad is making rapid progress with the conversion of its suburban lines out of New York for electric service. The construction is well under way and the equipment is on order. The work probably will be completed during the present year.

The Reading Company is proceding with plans for the electrification of its Philadelphia terminal and the suburban lines running out of it. The authorization was made late in 1928, and construction work is just beginning.

Steam Railroad Electrification Reported for 1929

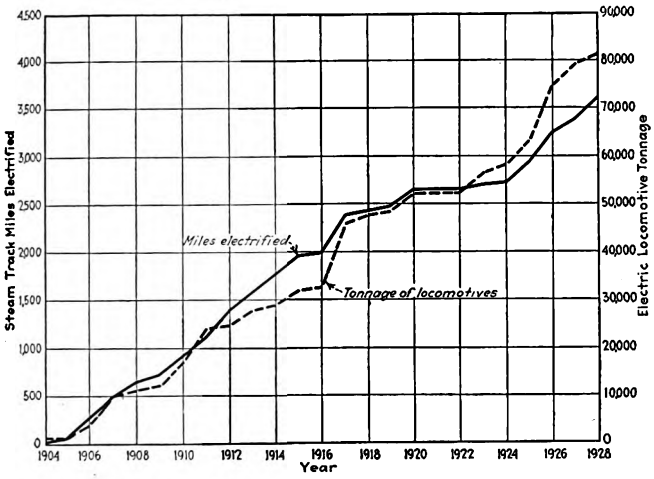
	Miles of Track
Cleveland, Cincinnati, Chicago & St. Louis Railroad, Cleveland....	4.25
Cleveland Union Terminals Company, Cleveland.....	4.01
Illinois Central Railroad, Chicago and vicinity.....	25.88
Long Island Railroad, New York and vicinity.....	9.23
New York Central Railroad, Cleveland.....	3.51
New York Central Railroad, New York and vicinity.....	2.46
New York, Chicago & St. Louis Railroad, Cleveland.....	5.32
New York, New Haven & Hartford Railroad, New York and vic'ty	1.59
Pennsylvania Railroad, Philadelphia-Wilmington.....	150.06
Virginian Railway, Roanoke, Va.-Mullens, W. Va.....	0.13

While the construction work was completed in 1928, electric operation of the new tunnel of the Great Northern Railway through the Cascade Mountains was opened in January of last year. This replaces the former short electrification of the old tunnel, and brings the electrified track on this system up to 87.5 miles.

During the year extensions to the Illinois Central electric zone in Chicago were made totaling 25.88 miles. This road also ordered four electric locomotives for freight switching in the Chicago terminal division. Figures for extensions to electrified track are given in one of the tables.

Among the new projects which have been discussed during the past year the outstanding one is that of the New York Central. Plans have been prepared in some

Digitized by Google



Mileage of Steam Railroads Electrified and Total Weight of Active Electric Locomotives in Tons

As reported by Committee on Heavy Electric Traction, A.E.R.E.A.

detail for the electrification of the system between New York and Buffalo. This is a section of dense traffic which ultimately, it is said, will have to be powered with some form of energy other than steam. No definite announcements have been made, but it is understood that the work as planned will cost in the neighborhood of $150,000,000.

The Lehigh Valley Railroad has received bids from the leading electrical manufacturers on the equipment of 75 miles of route of its main line between Mauch Chunk and Wilkes-Barre, Pa. The cost of this project would be between $7,000,000 and $10,000,000, and would assist traffic on the ruling grades of the system. The section is through mountainous territory, and the use of electricity would make possible the movement of more and longer trains at greater speed than is possible with steam.

In foreign countries the progress in electrification is in line with that in this country. The Central Argentine Railway was authorized in 1929 to proceed with the extension of its suburban electrification out of Buenos Aires. The new project involves a total of 26 miles. The Central Terminal Railway of Buenos Aires is constructing 5½ miles of double-track subway into the main business district of the city, with the intention of operating its passenger trains to a new terminal to be built in the business district.

The New South Wales Government Railway is converting to electric traction its suburban services at Sydney. It is expected that the project, involving about 400 track-miles, will be completed this year.

Work is in progress on the electrification of the divisions of the Great Indian Peninsula Railway between Kalyan and Poona and Igatpuri. With the main line from Bombay to Kalyan already completed, the total electrification will comprise about 180 miles of route.

Electrifications are also planned in the Netherlands, Sweden, Germany, Italy, France and Spain. In England and Austria plans have been deferred for economic reasons. The principal Swiss railways already have been converted to electric operation, and comparatively few lines demand a change to electric power at present.

Installations of Electrical Operation of Steam Railroads in the United States

Based on original data, supplemented by reports of the American Electric Railway Engineering Association and the National Electric Light Association

Railroad—Location	Electric Mileage		System			Year Electrified	Electric Locomotives		Motor Cars	Daily Trains		Annual Car-Miles	
	Route	Track	Volts	Cycles	Contact Line		Pass.	Freight		Pass.	Freight	Pass.	Freight
Baltimore & Ohio—Baltimore, Md.	3.6	9.1	675	d.c.	Rail	1895	12	*a*	0	13	21	142,590	1,297,900
Boston & Maine—Hoosac Tunnel, Mass.	7.9	21.4	11,000	25	Over'd	1911	*a*	7	0	12	28	215,172	3,868,065
Butte, Anaconda & Pacific—Butte-Anaconda-Rocker, Mont.	37.4	145.8	2,400	d.c.	Over'd	1913	1	27	0	4	6	117,457	5,079,040
Chicago, Milwaukee, St. Paul & Pacific—Harlowton, Mont.-Avery, Idaho	440.1	578.0	3,000	d.c.	Over'd	1916	9	27	0	4	.....	6,553,898	52,190,990
Othello-Tacoma-Seattle, Wash.	218.4	305.4	3,000	d.c.	Over'd	1920	5	15	0	4	.....	3,810,520	15,810,893
Great Falls, Mont. (Yard)	0.0	6.9	1,500	d.c.	Over'd	1915	.....	.....	.....	.....	.....	.....	.....
Gallatin Valley Branch	18.8	24.8	600	d.c.	Over'd	.....	.....	1	1	.....	.....	.....	.....
Cleveland Union Terminal—Cleveland, Ohio	18.8	40.0	3,000	d.c.	Over'd	*a*	22	0	0	.....	.....	.....	.....
Delaware, Lackawanna & Western—Hoboken-Dover-Gladstone, N. J.	70.0	160.0	3,000	d.c.	Over'd	*b*	.....	.....	141	.....	.....	.....	.....
Detroit, Toledo & Ironton—Fordson-Flat Rock, Mich.	16.6	50.0	22,000	25	Over'd	1926	0	2	0	0	8	.....	.....
Erie—Rochester-Mt. Morris, N. Y.	34.0	38.0	11,000	25	Over'd	1907	0	0	8	20	0	535,000	0
Ft. Dodge, Des Moines & So.—Ft. Dodge-Rockwell, Iowa	146.6	195.1	1,200	d.c.	Over'd	1912	0	12	13	8	12	275,000	2,585,657
Grand Trunk (Canadian National)—Port Huron, Mich.-Sarnia, Ont.	3.7	12.2	3,300	25	Over'd	1908	0	9*e*	0	9	4	127,367	2,532,176
Great Northern—Skykomish-Wenatchee, Wash.	72.8	87.5	11,500	25	Over'd	1929	5*e*	5	0	8	4	.....	.....
Illinois Central—Chicago-Richton, Ill.	37.8	152.1	1,500	d.c.	Over'd	1926	0	0	140	552	0	10,814,046	0
Long Island—New York, N. Y.	122.8	361.4	650	d.c.	Rail	1905*c*	7	8	742	895	8	42,914,621	.....
Bay Ridge-Fresh Pond Jc., N. Y.	11.9	84.4	11,000	25	Over'd	1927	0	7	0	0	30	0	.....
Michigan Central—Detroit, Mich-Windsor, Ont.	4.5	28.6	650	d.c.	Rail	1910	12*e*	.....	0	38	47	474,530	1,728,084
New York Central—N.Y.-Croton-White Plains, N.Y.	63.1	330.1	650	d.c.	Rail	1906*c*	83	9	336	505	45	23,391,989	.....
New York, New Haven & Hartford—Nantasket Jc.-Pemberton, Mass.	6.9	16.2	650	d.c.	R&O	1895	0	0	8	36	0	.....	0
Providence, R. I.-Fall River, Mass.	23.9	38.6	650	d.c.	Over'd	1901	0	0	22	42	0	702,382	0
Woodlawn, N. Y.-New Haven, Conn. *f*	75.2	519.6	11,000	25	Over'd	1907*c*	71	73	65	190	44	24,523,377	53,000,000
Stamford-New Canaan, Conn.	7.9	9.8	11,000	25	Over'd	1908	*g*	*g*	*g*	32	2	*g*	*g*
S. Norwalk-Danbury, Conn.	23.7	31.0	11,000	25	Over'd	1925	*g*	*g*	*g*	8	6	*g*	*g*
Port Morris-Fresh Pond Jc., N. Y. *h*	9.0	26.3	11,000	25	Over'd	1918*c*	*g*	*g*	*g*	18	21	350,000	9,149,807
Norfolk Southern—Norfolk-Virginia Beach, Va.	44.5	54.3	575	d.c.	Over'd	.....	2	.....	19	.....	.....	.....	.....
Norfolk & Western—Bluefield-Iaeger, W. Va.	63.7	209.1	11,000	25	Over'd	1915*c*	0	16	0	.....	34	.....	.....
Northwestern Pacific—Corte Madera-Sausalito, Cal.	20.6	40.4	600	d.c.	Rail	.....	.....	.....	44	.....	.....	.....	.....
Pennsylvania—Camden-Atlantic City, N. J.	75.0	150.1	650	d.c.	Rail	1906	0	0	107	48	0	3,310,533	0
New York, N. Y.-Manhattan Transfer, N. J.	13.4	103.7	675	d.c.	Rail	1910	46	0	0	200	0	.....	0
Philadelphia-Paoli-Chestnut-Hill, Pa.	36.2	129.8	11,000	25	Over'd	1915*c*	1	0	158	172	0	4,253,055	0
Philadelphia, Pa.-Wilmington, Del.	52.6	140.3	11,000	25	Over'd	1928	0	0	123	75	0	615,580	0
Reading—Philadelphia, Pa. and suburbs	.....	.....	11,000	25	Over'd	*d*	.....	.....	.....	.....	.....	.....	.....
Southern Pacific—Oakland-Alameda-Berkeley, Cal.	50.0	118.8	1,200	d.c.	Over'd	1911	0	3	87	780	0	4,022,617	0
Virginian—Roanoke, Va.-Mullens, W. Va.	134.0	229.8	11,000	25	Over'd	1925*c*	0	14	0	0	19	0	29,120,883

a To be completed in 1930. *b* To be completed in 1931. *c* Includes extensions in subsequent years. *d* Under construction, *e* Passenger and freight. *f* Operates on New York Central between Woodlawn and Grand Central Terminal, New York. *g* Included in Woodlawn-New Haven section. *h* New York Connecting R.R.

Digitized by Google

Low Records Made in

Trolley Wire Breaks

Continued improvement over previous figures was shown in 1929. Survey shows average reduction of more than 60 per cent accomplished during past eight years

DATA compiled by various of the leading electric railway systems in the United States and Canada show that the number of trolley wire breaks per year is steadily decreasing. Notable achievements in this direction have been made by the railways in Chicago, Detroit, Cleveland, Baltimore, Boston, Birmingham, Louisville, New Orleans and Toronto. Although the number of car-miles operated has remained practically constant for the group of properties included in this survey, the number of breaks has been reduced more than 60 per cent during the past eight years.

Reasons for failure can be classified under two main headings, namely, those due to uncontrollable causes and those due to inherent characteristics. Among the uncontrollable causes are burnouts by shovels, grinders, welders, foreign wires, and fires, while the causes of inherent failures are such as worn wire, defective fittings, burnt spots, crystallization or fatigue, flaws in wire and worn fittings. Reductions have been made under both classifications by systematic inspection and maintenance methods.

Differentiation between so-called uncontrollable causes and defects and wear varies somewhat on different properties. According to the classifications used in Boston, Detroit and Cleveland it appears that slightly more breaks are due to defects and wear than to uncontrollable causes, the ratio being about 60-40. Figures for breaks occurring on these properties in 1928 are summarized in the following table:

Causes of Trolley Wire Breaks

	Boston	Detroit	Cleveland	Total	Per Cent
Defects and wear.....	45	38	8	91	58
Uncontrollable.....	23	22	20	65	42
Total.....	68	60	28	156	100

Regular inspections are made either on a time basis or on the basis of the number of car passes. In Baltimore, for example, the entire overhead system is inspected once a month. In Chicago inspection is made after approximately 60,000 car passes and in Cleveland after 50,000. On lines where cars operate on a short headway this results in comparatively frequent inspection, while on the less heavily traveled lines the period between inspections is longer.

Since 1927 the Chicago Surface Lines has had a crew inspecting sections every 60,000 car passes. This crew also renews ears and other miscellaneous small fittings. If, however, the line crew finds any of the larger elements of the overhead system to be in need of replacement or repair and the crew cannot take care of the job themselves, they report this to the superintendent, who assigns a regular repair crew to make the required repairs. This company renewed an average of 173 miles of trolley wire per year from 1914 to 1927 but in 1928 replacements were reduced to 78 miles and during the first 9 months of 1929 only 74 miles was replaced. The Chicago Surface Lines has found also that the use of underslung ears and armor has been an important factor in the reduction of trolley breaks.

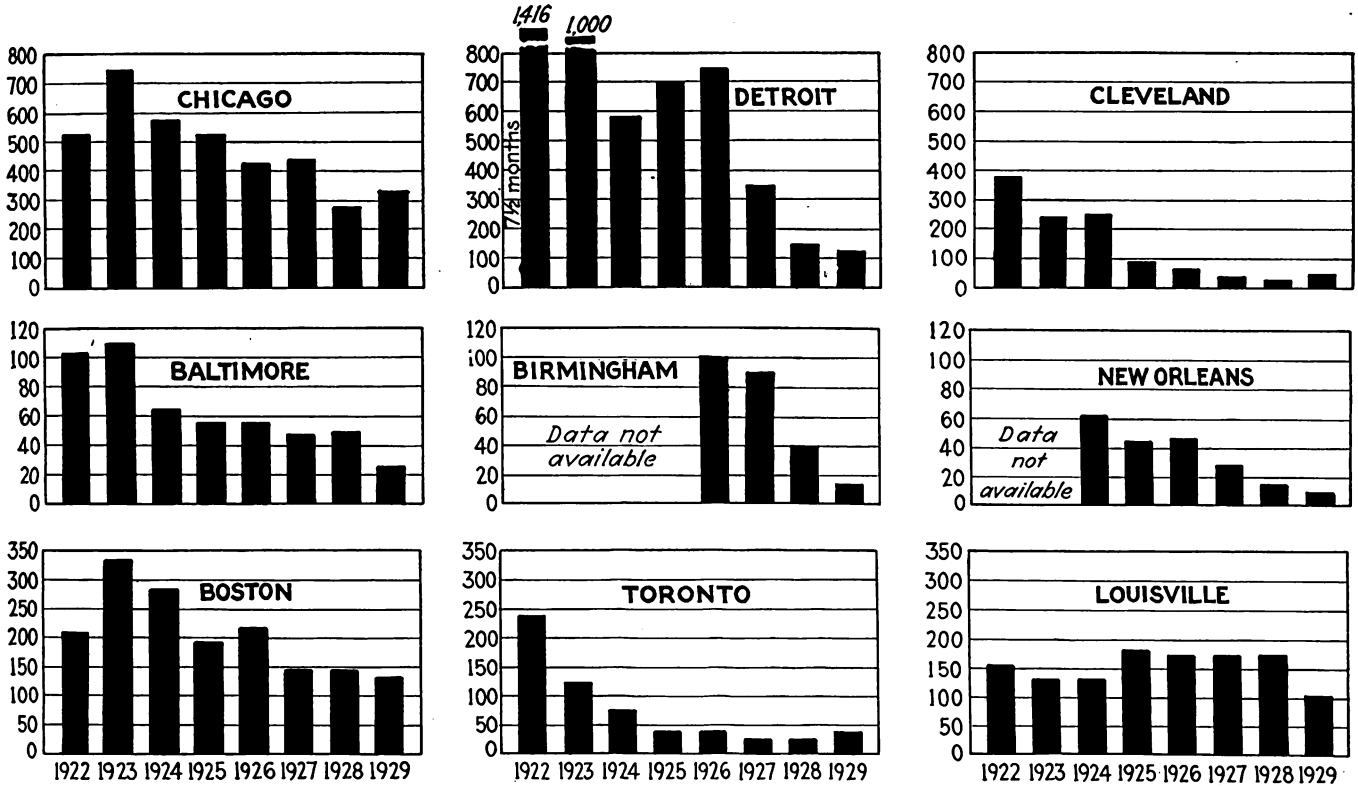
The Cleveland Railway considers it of great benefit to the maintenance of its overhead system to give the line crews a thorough training. Samples of wire in different stages of wear are shown to the men, and they are instructed as to just how far this wear may progress until the defective section has to be replaced in order to prevent a wire break and a consequent delay and tie-up of traffic. Cleveland line crews are provided with gages for inspecting the wire, thus enabling them to determine accurately just when a certain piece of wire has to be replaced. If a wire is reported to be in need of substitution a special line inspector makes a careful examination and submits a report. The decision as to the action to be taken is then left to the superintendent, who from his experience determines whether replacement is necessary or not.

The average length of wire maintained by each line crew of the United Railways & Electric Company of Baltimore is approximately 60 miles. The New Orleans Public Service and several others, however, allot 100 miles to each crew. As a rule, repairs on fittings are made during the day but replacement of wire, except for actual breakdowns, takes place during the night on most properties.

Line crews in Baltimore are available for 24 hours. During the day they are not kept at their stations but inspect continually the overhead system. They are required to call the dispatcher at regular intervals, informing him as to their location so that in case of emergency they can be located at once. Each crew is assigned a certain portion of the system for which it has sole responsibility, and is held accountable for the up-keep and general condition of the overhead structures. In this way the entire system is covered thoroughly not less than once a month.

In Baltimore it also has been found desirable to study the form of trolley wheel, as this has been responsible

Digitized by Google



Progress in overhead trolley wire maintenance during the last eight years is clearly shown by the general decrease in the number of breaks

for many of the breaks. As a result the U-groove type of wheel has replaced the V-type formerly in use on the property, with a reduction in the number of replacements of ears to about one-fourth of what they were four years ago.

Research in overhead construction characteristics has been carried on extensively by the Cleveland Railway. It has been observed that the ears which are near car stops, beyond the point where the car comes to a standstill, are most subject to burndowns due to the starting arc. These ears usually have to be replaced every inspection period. Ears farther away from the car stop will last three or four inspection periods. Ears located before car stops will only wear out on account of mechanical causes, as the current is almost always cut off as the trolley passes over them prior to coming to a stop and they will only be worn out by the friction of the collector.

Maintenance of Span Wires Important

Several railways included in this survey believe that best results are obtained when the contact wire is kept taut and the span wires comparatively slack. Proper maintenance of the span wires and ears is of great importance and has direct influence on the number of trolley wire breaks. Experience of the United Railways & Electric Company of Baltimore indicates that it is advantageous to have the ends of the ears taper ground to afford the trolley wheel an unobstructed approach and run-off, thereby increasing the wear on the wire itself. Another matter of vital importance is the use of only high quality material in the overhead structure.

Much attention is given also to the proper maintenance and inspection of the collecting devices on car equipment. Loose trolley wheels or shoes not only disturb the passengers by their abnormal noisiness but also cause more rapid wear of the contact wire. Many companies have enlisted the aid and co-operation of building contractors and others who move loose building equipment, shovels, etc., across car lines, and they thus reduce considerably the number of wires burned out or pulled down. One company has gone so far as to ask all contractors in its city to notify it when shovels or other equipment have to be moved across car lines, and a special line crew is assigned to assist them in crossing the track.

It is worthy of note that on all of these properties which have made excellent records in reduction of trolley wire breaks the improvement has not been made with a sacrifice of economy. Instead, the total cost has in nearly every instance been reduced. The line crews, instead of taking all their time in making emergency repairs that can only be considered temporary, now spend more effort in making permanent renewals of trolley wire as a matter of routine. The work is then done with more care and as a result the tendency to failure in service is greatly reduced. More efficient methods of stringing trolley wire have been devised in several of the cities mentioned. These have been noted in this paper from time to time. Reclamation of materials also is practiced to a large extent and considerable savings are made in maintenance expense.

Apart from any direct saving in cost of carrying on the work of the line department, all of the companies have made large savings in transportation expense on account of fewer delays to cars. There has also been a greater gross revenue due to the very small number of tie-ups as compared with the records of past years when the work of the line department was not organized as efficiently as it is at present.

Digitized by Google

Monthly and Other Financial Reports

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Key System Transit Co., Oakland, Cal.					
October, 1929	617,783	.....	.....	.....	*30,803*
October, 1928	629,852	.....	.....	.....	*53,530*
10 mo. end. Oct., 1929	5,903,991	.....	.....	.....	*842,904*
10 mo. end. Oct., 1928	6,017,318	.....	.....	.....	*537,341*
Market Street Railway, San Francisco, Cal.					
November, 1929	799,843	656,119	.....	143,724	85,452
November, 1928	.....	.....	.....	.....	.....
12 mo. end. Nov., 1929	9,584,907	8,084,583a	.....	1,500,324	786,014
12 mo. end. Nov., 1928	9,795,829	8,324,868a	.....	1,470,961	.....
Capital Traction Co., Washington, D. C.					
October, 1929	370,108	263,356	29,329	80,097	49,881
October, 1928	377,300	256,792	28,688	95,851	67,058
10 mo. end. Oct., 1929	3,564,165	2,558,662	275,210	751,534	446,781
10 mo. end. Oct., 1928	3,613,504	2,540,932	289,178	808,517	512,988
Jacksonville Traction Co., Jacksonville, Fla.					
October, 1929	96,472	79,495	9,037	7,389	.....
October, 1928	102,749	82,286	8,875	10,996	.....
12 mo. end. Oct., 1929	1,150,146	942,972	107,807	93,124	*64,125*
12 mo. end. Oct., 1928	1,219,114	973,281	108,261	130,781	*84,655*
Honolulu Rapid Transit Co., Honolulu, T. H.					
October, 1929	88,576	52,387	7,932	30,242	15,297
October, 1928	91,310	53,119	13,172	26,502	18,795
10 mo. end. Oct., 1929	878,604	504,821	90,011	294,685	180,445
10 mo. end. Oct., 1928	896,373	525,874	120,999	260,672	182,008
Honolulu Rapid Transit Co., Honolulu, T. H.					
November, 1929	85,384	51,473	7,932	27,044	15,407
November, 1928	86,169	51,366	13,046	22,829	15,124
11 mo. end. Nov., 1929	963,989	556,295	97,943	321,729	195,850
11 mo. end. Nov., 1928	982,543	577,241	134,046	283,500	197,130
Chicago Surface Lines, Chicago, Ill.					
November, 1929	5,246,124	4,056,792a	.....	1,199,332	898,499k
November, 1928	5,208,725	4,052,149a	.....	1,156,576	871,572k
Des Moines City Railway, Des Moines, Iowa					
October, 1929	180,198	124,397	.....	.....	13,053
August, 1929	177,305	134,732	.....	.....	154
United Railways & Electric Co., Baltimore, Md.					
October, 1929	1,460,077	962,111	140,656	371,860	87,260
October, 1928	1,437,781	908,727	156,669	384,384	92,584
10 mo. end. Oct., 1929	13,838,333	9,443,190	1,340,756	3,203,953	381,670
10 mo. end. Oct., 1928	13,482,451	9,035,030	1,309,056	3,260,461	416,253
United Railways & Electric Co., Baltimore, Md.					
November, 1929	1,407,934	919,304	142,421	355,717	72,462
November, 1928	1,360,315	870,431	140,568	361,455	76,260
11 mo. end. Nov., 1929	15,246,268	10,362,494	1,483,178	3,559,670	454,133
11 mo. end. Nov., 1928	14,842,766	9,905,462	1,449,625	3,621,916	492,514
Boston Elevated Railway, Boston, Mass.					
October, 1929	2,929,491	2,048,406	137,268	758,760	64,866
October, 1928	2,980,077	2,153,209	131,745	709,236	3,135
4 mo. end. Oct., 1929	.....	.....	.....	.....	780,512
4 mo. end. Oct., 1928	.....	.....	.....	.....	931,392
Eastern Massachusetts Street Ry., Boston, Mass.					
October, 1929	681,562	465,241	26,732	215,385	67,947
October, 1928	711,035	471,762	31,561	233,526	66,292
10 mo. end. Oct., 1929	7,154,387	4,510,930	318,417	2,517,670	784,164
10 mo. end. Oct., 1928	7,499,552	4,853,317	297,034	2,552,284	808,460
Boston, Worcester & New York Street Ry., Framingham, Mass.					
October, 1929	61,124	51,638	1,625	8,651	7,181
October, 1928	56,904	49,298	1,614	6,217	4,747
10 mo. end. Oct., 1929	618,580	499,955	16,523	113,757	99,057
10 mo. end. Oct., 1928	625,928e	534,133	16,148	77,675	62,826
Middlesex & Boston Street Railway, Newtonville, Mass.					
3 mo. end. Sept., 1929	260,095	230,722	8,702	20,671	*18,363*
3 mo. end. Sept., 1928	263,435	246,129	5,343	11,963	*28,127*
9 mo. end. Sept., 1929	859,897	623,319	25,399	111,179	*5,659*
9 mo. end. Sept., 1928	875,038	747,626	17,538	109,874	*11,552*
Department of Street Railways, Detroit, Mich.					
November, 1929	1,932,988	1,477,477	61,987	403,476	256,822
November, 1928	2,097,518	1,639,648	63,435	423,734	262,888
12 mo. end. Nov., 1929	26,520,209	20,983,064	748,021	4,907,464	3,245,066
12 mo. end. Nov., 1928	24,486,908	19,130,829	784,629	4,827,221	2,910,339
Duluth-Superior Traction Co., Duluth, Minn.					
3 mo. end. Sept., 1929	404,098	345,901	.....	58,197c	*18,519*
3 mo. end. Sept., 1928	429,985	363,194	.....	66,791c	*11,987*
9 mo. end. Sept., 1929	1,349,290	1,129,973	.....	219,317c	*13,609*
9 mo. end. Sept., 1928	1,440,423	1,156,173	.....	284,250c	37,053
Kansas City Public Service Co., Kansas City, Mo. (See E.R, J.-Dec.)					
October, 1929	761,938	578,448	41,675	141,813	66,889
October, 1928	.....	.....	.....	.....	.....
10 mo. end. Oct., 1929	7,434,118	5,627,347	416,750	1,390,020	614,329
10 mo. end. Oct., 1928	.....	.....	.....	.....	.....
Kansas City Public Serzice Co., Kansas City, Mo.					
November, 1929	746,136	615,461a	.....	130,675	55,821
11 mo. end. Nov., 1929	8,180,255	6,659,560a	.....	1,520,695	670,150

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Lincoln Traction Co., Lincoln, Neb.					
October, 1929	.....	.....	.....	.....	.....
October, 1928	.....	.....	.....	.....	.....
10 mo. end. Oct., 1929	394,582	324,651	.....	49,801	9,819
10 mo. end. Oct., 1928	395,552	300,058	.....	73,425	22,268
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
October, 1929	92,098	62,446	4,300	30,444	*779*
October, 1928	86,037	60,240	5,775	22,559	*9,037*
10 mo. end. Oct., 1929	846,679	633,507	74,860	248,404	*69,674*
10 mo. end. Oct., 1928	864,356	621,237	76,335	255,646	*62,296*
Jamestown, Westfield & Northwestern R.R., Jamestown, N. Y.					
9 mo. end. Sept., 1929	224,690	195,769	10,125	35,433	9,525
9 mo. end. Sept., 1928	187,296	193,023	10,125	476	*4,431*
Brooklyn-Manhattan Transit Corporation, New York, N. Y.					
November, 1929	4,987,071	3,345,314	273,696	1,443,361	673,707
November, 1928	3,970,021	2,477,877	264,260	1,307,147	605,723
5 mo. end. Nov., 1929	25,210,850	17,021,861	1,596,231	6,943,391	3,052,578
5 mo. end. Nov., 1928	20,000,199	13,142,902	1,382,900	5,886,399	2,432,232
Brooklyn & Queens Transit Corporation, New York, N. Y.					
November, 1929	1,929,432	1,549,294	98,255	304,005	178,518
November, 1928	1,964,189	1,571,694	110,651	305,156	176,636
5 mo. end. Nov., 1929	9,933,027	7,874,414	565,470	1,600,398	975,556
5 mo. end. Nov., 1928	10,076,325	8,373,900	537,715	1,272,400	626,412
Hudson & Manhattan R.R., New York, N. Y.					
November, 1929	1,059,113	510,620a	.....	548,492	215,618
November, 1928	1,044,884	528,924a	.....	515,960	180,933
11 mo. end. Nov., 1929	11,405,284	5,740,672a	.....	5,664,612	1,974,920
11 mo. end. Nov., 1928	11,287,618	5,874,471a	.....	5,413,147	1,722,957
Interborough Rapid Transit Co., New York, N. Y.					
October, 1929	6,387,991	3,995,255	202,126	2,190,638	*150,664*
October, 1928	6,143,922	3,668,587	202,456	2,272,878	473,808
4 mo. end. Oct., 1929	22,961,459	14,995,361	799,700	7,166,397	*607,651*
4 mo. end. Oct., 1928	21,543,264	13,953,164	795,566	6,794,533	*410,701*
Interborough Rapid Transit Co., New York, N. Y.					
November, 1929	6,276,425	3,666,977	201,549	2,407,898	*182,647*
November, 1928	5,925,143	3,578,340	201,588	2,145,124	345,546
5 mo. end. Nov., 1929	29,237,885	18,662,339	1,001,249	9,574,296	*730,199*
5 mo. end. Nov., 1928	27,462,408	17,531,504	997,155	8,939,748	65,155
Long Island Railroad, New York, N. Y.					
October, 1929	3,578,672	2,442,505	250,773	885,394	711,856h
October, 1928	3,664,309	2,452,332	219,239	992,738	821,416h
10 mo. end. Oct., 1929	35,131,457	12,268,686	2,744,112	9,524,574	7,918,561h
10 mo. end. Oct., 1928	34,209,872	10,482,000	2,402,214	8,079,786	6,591,414h
New York Railways, New York, N. Y.					
September, 1929	535,117	453,486a	.....	81,631	20,554d
September, 1928	541,159	457,322a	.....	83,837	19,096d
9 mo. end. Sept., 1929	4,696,094	4,110,354a	.....	585,740	38,242d
9 mo. end. Sept., 1928	4,957,177	4,278,007a	.....	679,170	115,175d
New York Railways, New York, N. Y.					
October, 1929	525,979	459,873a	.....	66,106	5,105f
October, 1928	569,792	490,828a	.....	78,964	27,223f
10 mo. end. Oct., 1929	5,222,073	4,570,227a	.....	651,846	43,347f
10 mo. end. Oct., 1928	5,526,969	4,768,835a	.....	758,134	142,399f
New York, Westchester & Boston Ry., New York, N. Y.					
October, 1929	218,467	136,808	24,047	59,480	*157,910*
October, 1928	215,179	147,383	20,525	48,026	*159,822*
10 mo. end. Oct., 1929	2,111,276	1,285,019	225,903	610,999	*1,544,185*
10 mo. end. Oct., 1928	1,985,809	1,327,487	199,486	469,810	*1,554,485*
New York, Westchester & Boston R.R., New York, N. Y.					
November, 1929	202,381	.....	.....	36,048	*180,500*
November, 1928	199,678	.....	.....	37,766	*169,752*
11 mo. end. Nov., 1929	2,313,658	.....	.....	636,402	*1,724,686*
11 mo. end. Nov., 1928	2,185,488	.....	.....	496,602	*1,689,136*
Staten Island Rapid Transit Co., New York, N. Y.					
October, 1929	229,918	161,196	18,000	50,722	40,227h
October, 1928	272,567	174,758	15,000	82,809	42,364h
10 mo. end. Oct., 1929	2,225,217	1,654,132	176,817	394,268	328,335h
10 mo. end. Oct., 1928	2,625,884	1,777,622	198,708	649,554	277,743h
Third Avenue Railway, New York, N. Y.					
October, 1929	1,320,170	1,007,189	92,385	241,078	*16,704*
October, 1928	1,365,099	1,031,860	96,329	245,046	8,838
4 mo. end. Oct., 1929	5,136,505	3,956,777	362,166	898,806	*139,775*
4 mo. end. Oct., 1928	5,196,596	4,002,640	380,357	884,359	*114,946*
New York State Railways, Rochester, N. Y.					
September, 1929	667,684	661,191a	.....	15,131	*111,645*
September, 1928	.....	.....	.....	.....	.....
12 mo. end. Sept., 1929	9,253,828	8,075,266a	.....	1,280,014	*257,303*
12 mo. end. Sept., 1928	.....	.....	.....	.....	.....
Troy City Railway, Troy, N. Y.					
12 mo. end. Sept., 1929	743,241	666,609	39,336	42,589	*57,411*
12 mo. end. Sept., 1928	770,852	545,588	38,140	83,824	*16,176*
New York State Railways, Utica Lines, Utica, N. Y.					
12 mo. end. Sept., 1929	1,433,952	1,009,386	111,226	39,621	*88,864*
12 mo. end. Sept., 1928	1,514,107	1,022,922	99,895	100,939	*27,959*

Digitized by Google

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Cincinnati Street Railway, Cincinnati, Ohio					
November, 1929.....	721,404	490,905	46,378	186,190	10,233
Community Traction Co., Toledo, Ohio					
October, 1929.....	306,768	244,503	.....	.....	2,383
October, 1928.....	324,341	236,885	.....	.....	.....
Lebanon Valley Street Railway, Lebanon, Pa.					
12 mo. end. Sept., 1929.	145,641	118,656a	.....	17,921	*7,079*
12 mo. end. Sept., 1928	150,175	109,528a	.....	31,134	6,134
Philadelphia & Western Ry., Norristown, Pa.					
October, 1929.....	71,112	37,112	.....	34,000c	19,840
October, 1928.....	77,555	37,734	.....	39,821c	24,664
Philadelphia & Western Ry., Norristown, Pa.					
November, 1929.....	67,305	49,552	.....	.....	17,753
November, 1928.....	68,796	49,176	.....	.....	19,620
11 mo. end. Nov., 1929	724,657	583,265	.....	.....	141,392
11 mo. end. Nov., 1928	762,606	609,786	.....	.....	152,820
Galveston-Houston Electric Railway, Houston, Texas					
October, 1929.....	46,399	26,557	2,716	17,125	.....
October, 1928.....	51,638	29,057	2,932	19,647	.....
12 mo. end. Oct., 1929	598,952	334,522	31,421	233,180	*37,078*
12 mo. end. Oct., 1928	656,615	383,429	31,483	241,701	*27,499*
Houston Electric Co., Houston, Texas					
October, 1929.....	289,119	176,475	27,114	85,529	.....
October, 1928.....	293,502	171,453	23,771	98,277	.....
12 mo. end. Oct., 1929	3,384,334	2,096,068	295,212	999,153	598,303
12 mo. end. Oct., 1928	3,319,296	2,028,260	294,231	996,804	588,675
Pacific Northwest Traction Co., Seattle, Wash.					
October, 1929.....	82,289	58,755	6,942	16,591	.....
October, 1928.....	70,403	67,383	5,179	*2,160*	.....
12 mo. end. Oct., 1929	937,596	733,532	56,471	147,590	30,825
12 mo. end. Oct., 1928	884,757	732,811	51,900	100,044	*66,408*
Seattle Municipal Railway, Seattle, Wash.					
October, 1929.....	477,244	401,911	.....	76,271	26,368
October, 1928.....	483,615	405,651	.....	79,678	27,014
10 mo. end. Oct., 1929	.....	.....	.....	.....	168,816
10 mo. end. Oct., 1928	.....	.....	.....	.....	*426,201g*
Calgary Municipal Railway, Calgary, Alta.					
10 mo. end. Oct., 1929	852,661	512,510	.....	340,151b	37,464
10 mo. end. Oct., 1928	.....	.....	.....	.....	44,673
Edmonton Radial Railway, Edmonton, Alta.					
9 mo. end. Sept., 1929.	621,100	402,068	.....	219,032	7,400
9 mo. end. Sept., 1928.	.....	.....	.....	.....	*5,881*
Edmonton Radial Railway, Edmonton, Alta.					
October, 1929.....	69,803	47,253	.....	22,549	201
October, 1928.....	67,875	43,867	.....	24,008	1,264
10 mo. end. Oct., 1929	690,904	449,321	.....	241,582	7,601
10 mo. end. Oct., 1928	656,624	438,808	.....	217,815	*2,616*
Lethbridge Municipal Railway, Lethbridge, Alta.					
9 mo. end. Sept., 1929.	45,315	36,587	.....	8,728	*14,541*
9 mo. end. Sept., 1928.	44,712	41,225	.....	3,487	*19,777*
British Columbia Electric Railway, Vancouver, B. C.					
September, 1929.....	1,169,278	784,097	.....	385,181b	.....
September, 1928.....	1,101,483	746,296	.....	355,187b	.....
3 mo. end. Sept., 1929.	3,494,751	.....	.....	1,135,632b	.....
3 mo. end. Sept., 1928.	3,284,759	.....	.....	1,031,641b	.....
British Columbia Electric Railway, Vancouzer, B. C.					
October, 1929.....	1,230,278	698,747	.....	531,531b	.....
October, 1928.....	1,145,394	631,879	.....	513,515b	.....
4 mo. end. Oct., 1929..	4,725,029	2,617,947	.....	2,107,082b	.....
4 mo. end. Oct., 1928..	4,430,053	2,453,297	.....	1,976,856b	.....
Guelph Radial Railway, Guelph, Ont.					
11 mo. end. Sept., 1929	80,935	74,739	1,877	4,319	*29,227*
11 mo. end. Sept., 1928	.....	.....	.....	.....	*23,768*
Ontario Hydro-Electric Railways, Essex District					
11 mo. end. Sept., 1929	1,142,904	859,237	4,346	279,320	*47,568*
11 mo. end. Sept., 1928	.....	.....	.....	.....	4,592
Regina Municipal Railway, Regina, Sask.					
10 mo. end. Oct., 1929	343,579	212,973	.....	130,605	12,671
10 mo. end. Oct., 1928	.....	.....	.....	.....	*2,808*
Saskatoon Municipal Railway, Saskatoon, Sask.					
10 mo. end. Oct., 1929	318,437	208,585	12,349	97,502	10,548
10 mo. end. Oct., 1928	.....	.....	.....	.....	3,587

Italic figures indicate deficit. *a* Includes taxes, *b* Net operating revenue. Before taxes. *d* Before adjustment bond interest. *e* Includes $41,793 special freight revenue. *f* Before adjustment bond interest. *g* Deficit after deducting $574,676 tax judgment. */* Net after rents. *j* Before reserves. *k* After joint account expenses, federal taxes, and city's 55 per cent. *l* Including Brooklyn & Queens Transit System.

More Than 3,000,000,000 a Year Carried in New York

RIDERS on the various transit lines in the city of New York totaled more than 3,317,400,000 passengers in the 1929 fiscal year, according to the annual report of the New York Transit Commission. During the year ended June 30, 1929, the rapid transit and street surface lines in the city carried a total of 2,972,400,000 passengers, an increase of 33,500,000 or 1.1 per cent over the preceding fiscal year. In addition the Hudson & Manhattan Railroad carried 111,800,000 passengers, and bus companies (exclusive of the Tompkins Bus Corporation and the municipal bus lines) 111,200,000 passengers, an increase of 58,000,000 or 1.9 per cent over the preceding year. The traffic of the Tompkins Bus Corporation is not included in the above comparison as no figures are available for the fiscal year 1928. This company carried 14,500,000 passengers in 1929. Traffic on the municipal bus lines, which do not report to the commission, has been estimated at 107,500. The total traffic, therefore, during the year ended June 30, 1929, on the rapid transit lines, Hudson tubes, street surface cars and bus lines, was more than 3,317,400,000 passengers.

The distribution of this traffic by classes of service was as follows:

Division of Passenger Traffic, New York Transportation Lines

	Per Cent of Total Traffic
Interborough Rapid Transit Co.	
Subway division	28.11
Elevated division	10.51
Total, I. R. T.	38.62
New York Rapid Transit Corporation	20.82
Total, rapid transit lines	59.44
Street surface lines	30.16
Hudson & Manhattan Railroad	3.37
Bus lines reporting to the commission	3.79
Municipal bus lines (estimated)	3.24
Total	100.00

Rapid transit traffic alone amounted to 1,971,800,000 passengers, or 53,300,000 (2.8 per cent) more than in 1928. The following tabulation shows the distribution by boroughs of the ticket sales or fare collections at all of the rapid transit stations, both Interborough Rapid Transit Company and New York Rapid Transit Corporation (Brooklyn-Manhattan Transit System), during the fiscal years ended June 30, 1929 and 1928:

	Fiscal Year		Increase	
Stations in	1929	1928	Number	Per Cent
Manhattan.....	1,149,260,509	1,135,237,354	14,023,155	1.24
Bronx.....	215,349,575	204,925,096	10,424,479	5.09
Brooklyn.....	486,137,756	466,798,253	19,339,503	4.14
Queens.....	119,650,532	110,167,414	9,483,118	8.61
Unallocated.....	1,446,787	1,376,628	70,159	5.10
Total.....	1,971,845,159	1,918,504,745	53,340,414	2.78

Fare collections at the Times Square subway stations during the two fiscal years were as follows:

	1929	1928	Increase
Interborough lines.....	55,944,891	55,093,646	851,245
N. Y. R. T. lines.....	35,936,443	34,630,250	1,306,193
Total, Times Square.....	91,881,334	89,723,896	2,157,438

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Kansas City, Mo.—The directors of the Kansas City Public Service Company on Dec. 26 approved the tentative plan of the company to purchase and operate the Yellow and the Checker cabs. The purchase contract still is in process of negotiation. Under the contract the railway would pay $187,000 cash for the property and assume a bonded debt of $375,000. The railway hopes to effect economies by combining the operating departments of the two companies.

✦

Los Angeles, Cal.—On Dec. 14, $118,041 was distributed in bonus checks and special awards to trainmen of the Los Angeles Railway. Of that amount $17,830 covered special awards which, in addition to the earned bonus, were divided among 912 men of the 2,046 who participated in the distribution. Many more men participated in the award this year than did so a year ago.

✦

New Orleans, La.—Judge Wayne G. Borah in the United States District Court has issued a temporary order restraining 815 alleged jitney operators from using their automobiles to carry passengers in competition with the street cars of the New Orleans Public Service, Inc., on which the union crews struck last July.

✦

St. Louis, Mo.—The St. Louis Public Service Company's new experimental fare of a twelve-ride weekly ticket for $1, single adult rides for 10 cents and children's at 5 cents instead of 3 cents, went into effect on Dec. 30. Six children's tickets may be purchased for 25 cents while ticket holders riding more than twelve times in any one week may secure the extra rides at 5 cents each. Hereafter ticket riders must present their tickets to be punched by the conductor when paying the fare, but there will be no limits on the number of times a ticket may be used in any week.

✦

New York, N. Y.—Standardized taxicabs for New York City have been agreed on by manufacturers, owners and Police Commissioner Whalen. All cabs now on the streets or in process of manufacture will be permitted to be sold and operated in the city, but all taxicabs manufactured after Feb. 1 for use in New York City must comply with new regulations. Cabs are to be of two classes, heavy cabs seating five or more passengers and light cabs seating two or three. They are to have larger rear windows.

✦

Boston, Mass.—The new high-speed trolley line between Mattapan and Ashmont was opened to the public on Dec. 21 by the Boston Elevated Railway. The new line cuts the running time from Mattapan to the center of Boston by nine minutes.

Late News Continued on Page 54

Eight-Cent Cash Fare Announced in Cleveland

New Rate in the Ohio City Went Into Effect on Jan. 1. Tickets Sell at Rate of Seven for 50 Cents

THE Cleveland Railway, Cleveland, Ohio, on Dec. 26, announced an increase in the rate of fare from 7 to 8 cents, effective on Jan. 1. The increase had been predicted, following a decision against the company by the United States District Court of Appeals in an income tax case.

Under the new rate of fare, tickets will be sold in strips of seven for 50 cents. In East Cleveland and Cleveland Heights, the two suburbs which pay a service-at-cost fare based on the Cleveland rate, the cash fare will advance from 9 to 10 cents, but the ticket rate will continue to be six for 50 cents.

The result of the company's announcement was an immediate revival of agitation for adoption of a zone system of fares urged by the company a year ago but tabled by the street railway committee of the City Council. President Alexander said:

"For many months the interest fund has been at a figure which would have made an increase necessary had we not been hopeful of a favorable decision in our long-pending income tax suit. The decision of the United States Court of Appeals, while a partial victory, makes impossible the continuance of the present rate until we can have appealed the case and have had a final adjudication.

"It is regrettable that the city did not agree with us at the beginning of the year on some application of the zone system which would make fares more equitable to riders. As it is, the increase falls largely on the city rider, whose ticket rate, as well as cash rate, is advanced.

"The East Cleveland and Cleveland Heights riders, generally, will pay no increase, only the cash rate and local fare being changed.

"Lakewood, of course, advances with Cleveland, although retaining its local rate. Perhaps with the differential between city and suburbs reduced to approximately 1 cent, except in cash rates, the making of a new franchise by Lakewood will be possible."

San Francisco Convention Plans Maturing

THE 49th annual convention of the American Electric Railway Association will be held at San Francisco, Cal., June 23 to 26, inclusive, 1930.

The national character of the convention brings together several thousand delegates. A sizable delegation from the various European and South American memberships of the association is also expected.

Committees are now at work under the direction of the general chairman, W. V. Hill, manager of the California Electric Railway Association, 58 Sutter Street, San Francisco, Cal. Edwin C. Faber, vice-president of Barron G. Collier, Inc., New York City, will have charge of the three special trains.

Cincinnati-Lake Erie Line Opened

The Cincinnati & Lake Erie Railroad, formed recently through the consolidation of the Cincinnati, Hamilton & Dayton Railway, the Indiana, Columbus & Eastern Traction Company and the Lima-Toledo Railroad, opened its electric line, linking the Ohio River with Lake Erie, on Dec. 31. The new system, announced by Dr. Thomas Contem is the longest, straight main electric interurban line in the world. It covers a route of 220 miles.

The new line will offer high-speed passenger and freight service with improved equipment. New types of motors have been developed for cars in this service which, under tests, have attained a speed of 75 m.p.h.

Consolidation of the three interurban lines was engineered by the Cincinnati, Hamilton & Dayton Railway under the direction of Dr. Thomas Conway, president of that line.

Officers of the new Cincinnati & Lake Erie Railroad, besides President Conway, are William L. Butler, Philadelphia, executive vice-president; J. H. McClure, Dayton, vice-president in charge of public relations; Richard Breckinridge, Cincinnati, vice-president in charge of traffic; H. C. Donecker, Dayton, vice-president in charge of research, and W. D. Gordon, Philadelphia, secretary and treasurer.

Cars, Buses, Taxis and Planes in Grand Rapids

A municipal transportation system which ties up street cars, buses, taxicabs and airplanes, has been effected in Grand Rapids, Mich., by the Grand Rapids Railroad. The move is looked upon by Louis J. DeLamarter, general manager, as one of the outstanding steps in city transportation service. He points out that the combined services of street car, bus and taxicab automatically will help each other to serve further the residents of the city, permitting the city's prin-

Digitized by Google

cipal transportation organization to meet every citizen's needs.

While the railroad has not taken over an air service, the Furniture Capital Air Service, Inc., has taken offices in the street railroad building and a fleet of planes is to be available at all times for aerial transportation service from Grand Rapids to any other city in the state with a landing field.

Special attention will be paid to emergency and commercial calls, which may be filed with the railway central office. The system has been worked out so completely that a person wishing plane service may call for a cab to the airport and his taxi driver will have his ticket for the flight when he arrives.

The entire system will be under municipal regulation.

The railroad plans a special school of instruction for the cab drivers. A similar school long has been in operation for trainmen.

The company also has announced it will spend approximately $100,000 in 1930 on improvements. Twenty new electric coaches will be placed in service as soon as possible, Mr. De Lamarter asserts.

Richmond Hard Hit by Storm

The recent cold wave, which froze up private automobiles and even made the average home in and around Richmond, Va., uncomfortable at times, was not in the least partial to the Virginia Electric & Power Company. The movement of cars and buses, which is ordinarily according to carefully worked out schedules, became exceedingly irregular. Frozen air lines, slippery tracks and pavements, disabled automobiles and trucks, and other causes contributed to the confusion. On Dec. 28 there were 21 fire alarms. General Manager Penick said:

"The other day we had a trolley break, the second in a year, and service was crippled temporarily over a considerable area, but the ice and sleet were the main contributors to irregular service.

"We are not citing the difficulties with which we have to contend as alibis for failures of our service, but we want our patrons to know the facts and when they know, we feel sure they will bear with us under such conditions."

Edward Dana on the Air

Edward Dana, general manager of the Boston Elevated Railway, Boston, Mass., gave the first of a series of radio broadcasts on Dec. 10 from Station WEEI. The broadcast is identified as the "El Service Hour" intended to give the public a better insight into and understanding of the problems and difficulties confronting present-day transportation companies. Mr. Dana said in part:

"We hope to make clear matters which cause misunderstandings, and demonstrate that our only aim is successful operation and satisfactory service. At present the equipment of the Boston Elevated Railway is modern in every respect. It compares favorably with the best in use anywhere in the country. By reason of this modernized equipment your trips on the Elevated system have been made more comfortable, speedier and safer."

Mr. Dana explained that the elevated carried 1,000,000 passengers daily. He said the company would do its utmost to render efficient service in all respects and under all circumstances.

City and Company Co-operate on Buffalo Improvements

The International Railway, Buffalo, N. Y., has been requested by the Buffalo City Council to undertake track reconstruction and roadbed improvements on 40 streets covering 32 miles of single track and involving an expenditure of approximately $1,920,000 for 1930. The tentative program was suggested by the municipal authorities at a conference attended by B. J. Yungbluth, president of the railway. President Yungbluth expressed the belief that this program was too much for the company to undertake in a single year, but consented to cooperate with the City Council in reaching an agreement on streets where the work is most essential.

Denver Fare Ordinance Advanced

With only one change, boosting from $10,000 to $15,000 annually the amount to be paid for use of city streets, the Denver Tramway Corporation ordinance, asking higher fares and permission to substitute bus routes for unprofitable rail lines, was passed on first reading by the City Council of Denver, Col., on Dec. 23.

A second passage Jan. 5 will make the bill operative, carrying provisions for 10-cent fares, or three tokens for 25 cents, and a cross-town bus route, in addition to several bus routes providing service for districts in which it seems desirable to supplant cars.

Two formal protests, representing 1,200 residents of East Denver and Montclair, were registered prior to passage of the ordinance. The protestants do not believe buses will provide adequate transportation facilities in their territory where electric trams are to be eliminated. On other phases of the bill there were no objections.

New Jacksonville Franchise Up Jan. 14

The Miller draft of the proposed franchise of the Jacksonville Traction Company, Jacksonville, Fla., to take the place of the one under which it now operates but which expires in 1932, will go to the company officially at once. The grant was placed on first reading at a special session of the City Council on Dec. 19, and referred to the laws and rules and public service committees jointly, with instructions to the recorder that copies be sent the company, along with a copy of the report and recommendations of the public service committee that this action be taken.

Under the recommendations of the public service committee the company will be asked to make a written reply to the communication, giving its views on the proposed franchise, as drafted by City Attorney Austin Miller, not later than Jan. 14, the next meeting date of the Council.

Louisville Situation Reviewed

President Barnes Goes Over the Accomplishments During His Regime in Southern City—System Returned to Dividend-Paying Basis

PRESIDENT J. P. Barnes, of the Louisville Railway, Louisville, Ky., issued a statement to the stockholders on Dec. 7 regarding the condition of the company. When Mr. Barnes became president of the company it was laboring under the handicap of a 5-cent fare, under an eighteenth-century type of franchise ordinance. Eventually a 7-cent cash fare was secured; then under federal injunction fares were advanced to 10 cents cash with three tickets for 25 cents.

	Service Given	Earings	Expense
1920.....	11,307,652 (Car-miles)	$4,146,507.28	$3,229,187.38
1928.....	13,136,871 (Car and bus-miles)	4,847,000.40	3,494,755.52
Increase....	1,829,219	$700,493.12	$265,568.14
Per cent....	16.18	16.89	8.22

The number of passengers carried has fallen off, due in part to higher fares, but also in part to the fact that there is considerable unemployment in Louisville at this time. Moreover taxicabs are operating at the rate of 2 miles for 25 cents, and are carrying four passengers for a single fare.

The increase in revenue under the new fare rates became effective too late to affect materially 1929 operations. The belief was expressed, however, that when normal conditions of employment and business in Louisville are restored, the company's earnings will show a material improvement over former years and permit the payment of greater dividends.

The statement set forth in detail the amount of dividends that have been paid under the present management.

The growth of the company is shown in the accompanying table:

President Barnes said in part:

"Not until the recent decision in our fare litigation did we achieve adjustment of the various matters criticised by the bankers who said, several years ago, that under the ordinance regulations in effect at that time neither legal right nor our ability to earn was sufficiently established to assure economical refinancing.

"When the present management took charge in 1920 no dividends, preferred or common, had been paid for two years, and the company's total liabilities exceeded its total assets by more than $400,000. By 1923 our operations and earnings had so improved that we were able to begin paying off accrued dividends on the preferred stock and, since that time, we have paid not only these dividends, but all current preferred dividends and $582,652 common dividends, as well. The total dividend payments have amounted to $2,332,652. At the

Digitized by Google

close of 1928 there had been accumulated a corporate surplus of $868,328. The report of Humphrey Robinson & Company, accountants, made as of Dec. 31, 1928, shows the common stock of the company to have a book value of $110 a share.

Refinancing Ahead

Our constant effort has been to build up a regular, dependable net earning capacity sufficient to meet the bankers' requirements for refunding operations.

"Since 1923 there have been added to the company's property 121 new cars, 43 buses and numerous smaller items of equipment. Many renewals and improvements of carhouses and track have been made.

"In view of this growth in earnings, addition to capital and improvement of property, there can be little doubt that the present low market quotations of Louisville Railway securities are due to uncertainty in the minds of investors as to the refunding of the $6,000,000 first mortgage bonds due July 1, 1930. We are continuing active negotiations for this refunding. Several plans are under consideration and, therefore, it is impossible to state at this time just what the final proposal will be. It may be that no refinancing plan will be perfected until after the decision of the city's fare appeal, which will be argued in the circuit court at Cincinnati on Jan. 6, 1930. As soon as positive recommendations can be made, I shall advise you fully."

LATE NEWS

Continued from Page 52

Pensacola, Fla.—Gulf Power Company forces are completing construction of the new tracks in the western section of the city for the Bayshore line. Under an agreement with the Frisco Railway when that road purchased parts of the Bayshore line, the power company will operate its Bayshore cars into the city over the spur line. The Frisco Railway is improving the portion of the Bayshore line purchased.

✦

Seattle, Wash. — Residents of the White River Valley, through which the abandoned Seattle-Tacoma interurban line is routed, have organized to formulate a plan whereby re-establishment of the electric system might be effected. A second meeting has been scheduled for Jan. 15 in the Auburn City Hall. Stage schedules were declared inadequate to serve transportation needs of valley residents. T. J. Ferguson, Auburn, is active in the movement.

✦

Chicago, Ill.—Failure of the City Council of Chicago to initiate action in the matter of the new subway and disputes among officials of the elevated and the surface lines as to whether the proposed State Street subway shall be for elevated trains or for both "L" and surface cars are cited as the two major causes of delay. The fact that the $57,000,000 railway fund, accumulated out of payments made by the surface companies to the city, is now represented in the main by paper, chiefly tax anticipation warrants, is another obstacle in the way of an underground for the Windy City. One definite step toward settling some of these problems was taken recently by a Council sub-committee which will seek to have the telephone company and the Commonwealth Edison company contract with the city to place their underground wires and mains in gallery space in the subway.

✦

Far Rockaway, N. Y.—The Transit Commission and the New York City Board of Transportation are holding a series of conferences for the purpose of working out a co-ordinated policy with respect to the Rockaway Branch of the Long Island Railroad. This is the branch which the company is desirous of selling to the city. The city cannot immediately answer the negotiation count. It will probably be five years before it will have in operation a trunk to Manhattan available to carry the Rockaway traffic, and during that time, unless some makeshift plan is adopted, there might be no relief from the grade-crossing menaces. Further, the estimates of the Board of Transportation engineers as to the cost of a new subway have not been fully developed, so that even if a price were fixed as between the railroad and the city the comparison of that price with present estimates of a new structure would be inconclusive.

✦

Fond du Lac, Wis. — Offering was made on Dec. 16 of a new issue of $2,500,000 Wisconsin Power & Light Company first lien and refunding mortgage 5 per cent bonds, due Dec. 1, 1958, at 96½ and interest. The corporation supplies electric light and power to 268 communities located in 30 counties of central and southern Wisconsin, and wholesales power to 65 communities having an aggregate population exceeding 700,000. In addition it gives 20 communities gas, water, electric railway, bus and heating services.

✦

Philadelphia, Pa.—The new escalator on the northwest plaza of City Hall on the Philadelphia Rapid Transit subway has been placed in operation. The escalator saves 43 of the 61 steps from the station platform to the surface. Passenger approach is by a short stairway from the platform to the mezzanine. Three passengers may ride abreast on the escalator, which will carry from 8,000 to 10,000 passengers per hour. It was built at a cost of $80,000.

✦

Aurora, Ill.—The Illinois Commerce Commission on Dec. 18 approved the issuance of $3,400,000 of 6 per cent ten-year gold notes of the Chicago, Aurora & Elgin Railroad to reimburse the company treasury for capital expenditures for recent extensive improvements made by the railroad.

✦

Tulsa, Okla.—The twelfth annual convention of the Oklahoma Utilities Association will be held at the Mayo Hotel here on March 11, 12 and 13, according to a decision reached by the executive board of the association. Active arrangements for the convention will soon be under way.

Waverly, N. Y.—Permission has been granted the Waverly, Sayre & Athens Traction Company by the New York Public Service Commission to operate buses in place of street cars from the New York-Pennsylvania state line at Cayuta Avenue in Waverly, N. Y., over certain streets in the village. Evidence showed that the company had paid no dividends in 36 years and that it is two years behind on its bond interest.

✦

Oakland, Cal.—Reconstruction of the street car tracks and paving on San Pablo Avenue, from the city limits of South Berkeley, Cal., to the north line of Ashby Avenue, is now being undertaken by the Key System Transit Company, according to the announcement of Alfred J. Lundberg, president.

✦

Richmond, Va.—Continued operation of the Richmond-Ashland Railway is possible only if citizens served by the road rally to its support. A committee of stockholders has been named to lay the matter before the people in territory adjacent to the 18-mile electric line. Due to loss of revenue and large expenses incurred in making emergency repairs to the viaduct leading into the station on West Broad Street, the company did not expect to be able to meet in full the interest payment on the mortgage bonds due on Jan. 1.

✦

Pasadena, Cal.—Elimination of every grade crossing in Pasadena, eventual electrification of the railroad, elevation of tracks, and installation of double tracks from Los Angeles to San Bernardino are plans which the Santa Fe Railroad is said to be about ready to make public.

✦

Ithaca, N. Y. — The Public Service Commission has decided to defer action on the application of the Ithaca Railway, Inc., for approval of the exercise of rights and construction under a franchise granted to it by the city of Ithaca on Aug. 7, 1929. This action will give the petitioner an opportunity of applying to the commission for approval of a reorganization following the sale of the property and franchises of the former Ithaca Traction Company in 1928. The sale was made, pursuant to an order of the Supreme Court, to Sherman Peer, as agent of a corporation to be formed, who operated the railway until it was turned over to the Ithaca Railway, Inc. The commission held that the reorganization should first be authorized by the commission before the company is in a position to receive the approval which it seeks in the present application.

✦

South Bend, Ind. — Sale of the Chicago, South Bend & Northern Indiana Railway under foreclosure was postponed on Dec. 28 until Feb. 1. Bankruptcy proceedings were entered to satisfy claims of several mortgage holders.

✦

Athens, Ga.—After January 1 people who have autoists for a lift inside the city limits of Athens will be liable to prosecution by the city. Under the new law no one will be allowed to ask for auto rides while standing in the streets or on the sidewalks. Any speech, motion or gesture to an autoist for a ride will be considered a violation of the law.

(*Continued on Page 57*)

Digitized by Google

Bridge Line Rolling Stock to Be Sold

Commissioner Albert Goldman of the Department of Plant and Structures of New York City, through whom, as the custodian of bridges, the deal with respect to the 3-Cent Line was transacted, states that very soon he proposes to dispose of the seventeen cars under the hammer. He will advertise them for a period and then knock them down to the highest bidder. The cars constituted the rolling stock of the defunct Manhattan Bridge 3-Cent Line, which went out of business on Nov. 13, when the city handed its owners a check for $206,750.29 in return for which the company abandoned its operation over the Manhattan Bridge and Flatbush Avenue extension between Fulton Street, Brooklyn, and the Bowery, in Manhattan, returned its franchise to the city and deeded the municipality its tracks, poles, trolley wires and cars—all it owned save some real estate on which is located its carhouse in Brooklyn.

$25,000,000 Expenditure Ahead for St. Louis

Stanley Clarke, president of the St. Louis Public Service Company, St. Louis, Mo., has informed the St. Louis Transportation Survey Commission that the company would spend $25,000,000 or more for additional equipment and other betterments to service, including extensions, if it could raise the money. To the end that this may be accomplished the commission has created a finance committee to work out a plan to enable the company to make the expenditures suggested by R. K. Kelker, Jr., consulting engineer for the commission.

In a recent report to the commission Mr. Kelker suggested the company spend $23,776,000 as follows: Rerouting car lines, $726,000; extensions, $1,338,000; feeder buses, $512,000; 800 new cars, $13,800,000; additions to substations, $1,400,000, and street paving between car tracks, $6,000,000.

He also recommended elimination of hundreds of stops and the ultimate driving of service cars or "jitneys."

Mr. Clarke is a non-voting member of the Transportation Survey Commission.

B. E. Sunny Sees Chicago Settlement Ahead

B. E. Sunny, chairman of the protective committee of the Chicago City & Connecting Railway collateral trust bonds, in a letter to the depositors of bonds says:

"In the letter of June 11, 1929, your protective committee reported that the necessary enabling legislation had been approved by the Governor. The subcommittee of the local transportation committee of the city of Chicago, in charge of working out a new ordinance, has completed a tentative draft of the proposed new franchise.

"The sub-committee left blank three or four sections dealing with the questions of rate of return on the capital account of the new company, amortization and sinking fund. The draft of these sections was deferred till the views of the reorganization committee could be obtained.

"As soon as the views of this committee on the questions of rate of return, amortization, sinking funds and other like problems can be obtained, it is hoped that the drafting of the new franchise will be completed promptly and sent to the City Council for consideration and approval, subject, of course, to a referendum. It is hoped that the ordinance can be passed and ample time given for a thorough discussion of the provisions of the ordinance so that a referendum may be had in the spring or early summer of next year"

Seattle Council Has Two-Year Moratorium Proposal

The City Council of Seattle, Wash., is now ready to take the last step necessary to make the two-year moratorium on the municipal railway bond redemption effective. Two ordinances have been introduced at a special Council session, and can be brought up immediately for passage. The plan is to limit payments to the bondholders to interest during 1930 and 1931 so as to enable the city, during the next few weeks, to repay fully the loan from the Water Department that was necessary to make the payments for 1929 on the purchase bonds. The Water Department loan should be wiped out before March. Heretofore the city has paid to the owners of the property now comprising the municipal lines not only interest but a part of the principal sum.

With the floating debt of the municipal railway wiped out, funds for the purchase of new cars and a modest rehabilitation of the lines will begin to accumulate. There has been no decision as to whether track improvements or new cars shall take precedence, though there is general agreement that the track work should take precedence.

Mayor Frank Edwards has declared that this is the first dividend it has been possible to give the car riders whose money is paying for the railway system, and he has demanded the best rolling stock available. At the same time the Mayor has repeatedly urged that in providing new cars as much work as possible be done in Seattle. He said:

"In this whole proceeding the car riders are entitled to first consideration, because it is their patronage which makes the purchase of the railway system possible and their money that keeps it going."

Inquiry Into Ownership of New York Properties

The Public Service Commission of New York by order issued on Dec. 27 directed the United Traction Company, the New York State Railways and the Schenectady Railway to produce before it in Albany, on Jan. 8, records in an inquiry instituted by the commission, on its own motion, to determine:

The ownership of the capital stock of the companies:

Whether any transfer or assignment of capital stock has been made in violation of the provisions of the public service commission law.

Whether any of the companies has made or recorded upon its books any transfer or assignment of capital stock in violation of the provisions of the public service commission law.

The order directs each of the three companies to produce at the hearing "its stock book and any and all other records showing or tending to show the present ownership of its capital stock and any and all transfers or assignments thereof" by the United Traction Company since June 17, 1927, by the New York State Railways since Jan. 1, 1928, and by the Schenectady Railway since Jan. 1, 1929.

Speeding Up the Louisville Service

The recent experiment by the Louisville Railway, Louisville, Ky., of allowing motormen on Market Street to disregard running time on outbound trips in certain territory has proved successful and is pleasing passengers by enabling them to reach their destination in a shorter period of time. In consequence the company has announced that, beginning at once on specified lines and at locations indicated, motormen may disregard running time and go on to the end of the line as soon as they can do so safely. Leaving time at the ends of the line and at all places other than those designated must be strictly observed.

In the territory in which passengers are picked up in quantity and at transfer points, the company enjoins upon its employees careful attention to the even spacing of the cars and strict observance of the running time.

In the territory where motormen are allowed to disregard the time schedule, cars must be operated with the proper slowdowns for dangerous street crossings. The exceptions that have been made to the regular running rules are solely to prevent the cars from having to drag in order to observe the schedule religiously.

Chicago Transfer Demand Deferred

The Chicago City Council's committee on local transportation has decided not to initiate before the Illinois Commerce Commission proceedings to obtain transfers between the surface and elevated lines. The resolution to this effect presented by Alderman John A. Massen eighteen months ago was sent instead to the subcommittee, which has been drafting the proposed new franchise.

Committee members who opposed starting proceedings before the state commission declared that to do so might interfere with the negotiations with the companies for a new ordinance. All agreed that better service is imperative, and favored incorporating the universal transfers in the new ordinance.

At the same session, a subcommittee of five councilmen was appointed to go before the commission with a request that the Surface Lines be permitted to use part of its $18,000,000 renewals and depreciation fund to build 125 miles of double-track extensions and to install feeder bus service.

The companies point out that the draft is as binding as possible on this point, and that the entire question of whether or not the companies will carry out the promised program depends on their ability to get the $200,000,000 of new monies required.

Other objections of the Aldermen to the proposed ordinance draft had to do with its failure to determine which faction shall pay for building the connection between the elevated system and the subway. The companies wish the city to do this, but the subcommittee desires that the companies reconsider the matter.

Digitized by Google

The Aldermen rejected the company's alternative section that the city pay for paving the surface line's right-of-way. They consider the section ambiguous which deals with removal of tracks and structures no longer necessary (which may or may not include the elevated loop). They also wish to include a provision that the new company pay the city 3 per cent of its gross receipts.

In general, the attitude of the Aldermen is one of uncertainty. They believe that the city is accorded less power in the proposed ordinance than it enjoys at present over the surface lines.

The Aldermen favor a subway to be built by the city through the central business district.

Public Service Fare Decision Based on Valuation

Newark Paper Analyzes Operation of New Jersey Company So Its Readers May Be Adequately Informed

WHEN the Public Utilities Commission of New Jersey handed down the fare decision in the Public Service Co-ordinated Transport application, the finding for the company granting a 10-cent cash fare with ten tokens for 50 cents, which went into effect on Jan. 1, was based on failure to earn a 7 per cent return. The valuation of the property was fixed by Judge Haight, who was special master in the company's application of 1921. In a letter to President McCarter, the commission stated that the company's operating income last year fell short by $3,300,000 of what a return of 7 per cent would have been upon the Haight valuation brought down to date. However, the commission also indicated that the company's operating revenue fell approximately $1,900,000 short of a 7 per cent return upon its own valuation at the same time, brought down to date.

An analysis of the earnings of the Public Service Co-ordinated Transport and its predecessors, the Public Service Railway and the Public Service Transportation Company, was made in a special article appearing recently in the Newark *Evening News*. The article points out that the only things about which the commission is concerned in its present decision are the operating income, that portion of the revenue remaining after deducting operating expenses, depreciation and taxes, and the valuation of the property placed on it by the authorities. The company's capitalization is not in any sense a factor, and it is only necessary that the company be allowed to earn a reasonable return upon the value of the property.

Nobody knows conclusively what a fair value of Public Service Co-ordinated Transport is, according to the article. There has been no valuation of the property since 1921, at least by the commission or the courts. In the 1921 fare case, there was a wide variance in the valuations submitted. The company claimed a value of approximately $200,000,000. An appraisal by Ford, Bacon & Davis, authorized by the Legislature, placed the value at $125,000,000. Mark Wolff, a utility expert, made a study resulting in an estimate of $100,000,000 historical cost. Other valuations were submitted.

After a study, the utilities commission finally decided that $82,000,000 was the value for rate-making purposes. The company carried the case to the federal courts and Judge Haight, as special master, found a value of not less than $110,000,000. These last two figures stand out, the one as the commission's findings and the other as the court's final decision.

Since 1921 there has been a revolution in the company's transportation methods. Buses have come to the fore and have passed trolleys in volume of business. Trolley lines have been abandoned and replaced by buses. How much remains of the original trolley inventory no one outside of Public Service itself knows. Therefore, nothing short of a new inventory and appraisal would establish what would be a fair value today.

Public Service has spent millions of dollars in acquiring bus lines and in purchasing new buses. It is debatable whether the company is entitled to receive a return upon the difference between a fair price for the buses and what it actually paid.

ANALYSIS OF RESULTS OF NEW JERSEY OPERATION

Year	Actual Operating Income	Needed Operating Income for 7 Per Cent Return on Judge Haight's Decision	P.U.C. 1921 Valuation	P.U.C. Valuation Less Bus Intangible
1922	$5,736,021	$7,820,139	$5,732,932	$5,732,932
1923	3,265,163	7,843,315	5,758,711	5,758,711
1924	4,055,052	7,909,172	5,831,989	5,750,247
1925	4,006,641	8,152,062	6,102,173	5,858,727
1926	5,046,933	8,635,193	6,639,827	6,132,061
1927	4,529,584	9,073,860	7,127,925	6,306,309
1928	5,602,252	9,379,738	7,476,001	6,504,390

In the first column of the accompanying tabulation is shown the operating income that Public Service actually has received, by years, through operation of its trolleys and buses, exclusive of the Public Service Railroad and interstate buses. These figures, by themselves, give no answer to the question of whether the company has been receiving a fair return upon the fair value of its properties. Using the several valuations, and bringing them down to date, the computation of earnings becomes simply a matter of mathematics.

Making the proper adjustment in the company's capital account for additions, withdrawals and retirements, and for accrued depreciation, the 7 per cent return on the basis of Judge Haight's decision has been figured out. This is shown in the second column of the tabulation. This exceeds by from $2,000,000 to nearly $4,000,000 the actual operating income of the company in the seven years examined.

If the original valuation made by the Public Utility Commission, which was $82,000,000 in 1921, be used as a rate base, with proper changes year by year, the 7 per cent return would be as shown in the third column. For the year 1922 this amount was virtually equal to the actual operating income. For each succeeding year it will be noted the deficiency in income has been greater. Even on this low basis the deficiency for 1928 was approximately $1,800,000.

Still another computation has been made, with deductions for the so-called intangible value of buses. It was the practice of the company, up to 1928, to divide the cost of buses between tangible and intangible value. The tangible value represented what the company believed the bus to be worth, while the balance between that and the price actually paid represented the intangible value. This intangible value, by years, has been between $2,000,000 and $4,500,000. Making a computation of earnings of 7 per cent upon the board's base valuation of 1921, with deductions for "intangible bus value," the figures given in the last column are obtained. Even using this basis, there is a deficiency in earnings in every year except 1922, varying between about $1,000,000 and $2,500,000.

Summarized, a 7 per cent return upon Judge Haight's valuation made in 1921 would total $58,813,483 for the period 1922-28. The total upon the board's valuation with inclusion of bus intangibles would be $44,669,562. With exclusion of all intangible bus values, the total for the period would be $42,043,380. The operating income of the company during that period has been $32,241,649.

Chicago Suburban Line Sold Under Foreclosure

The Hammond, Whiting & East Chicago Railway was sold at auction on Dec. 26 to a syndicate of business men headed by Morse Dell Plain, president of the Northern Indiana Public Service Company. The sale was conducted by Ernest Force, special master in chancery, who acted under a decree of Federal Judge Slick. The sale price was $300,000.

A mortgage of $1,788,000 had previously been foreclosed on the property. The sale was approved on Dec. 28 by Judge Slick.

According to present plans the recently organized Calumet Railways, Inc., will take over the property. The Calumet Railways, Inc., seeks to obtain franchises from the three cities involved. If it is successful in doing this, the Insull organization will provide money for rehabilitation.

Ohio Interurban Sells Its Power Lines

Sale of all its power lines and poles, and the rights-of-way for such lines to the Ohio Edison Company, Springfield, Ohio, was announced on Dec. 26 by the Cincinnati & Lake Erie Railroad, the through electric railway system formed by the merger of the lines of the Cincinnati, Hamilton & Dayton Railway, the Indiana, Columbus & Eastern, and the Lima-Toledo Railway lines recently. The sale price was $350,000. Coincident with the announcement of the sale, the company also revealed that it was entering into a contract with the Springfield company whereby, in the future, the Ohio Edison Company will supply all of the power for the railway lines.

Digitized by Google

Program of Transportation Men Takes Shape

The meeting of the executive committee of the Transportation and Traffic Association held at the office of C. H. Evenson at Chicago on Dec. 10, 1929, was devoted largely to consideration of the program for the San Francisco convention in June. A letter of George B. Anderson, chairman of the program committee, announced tentative choice of speakers for the meeting and outlined the program for the three-day session. It was the opinion of those present that in the future fewer luncheon conferences should be held and that no subjects under study by the association committees should be chosen as topics for the luncheon meetings. President Samuel Riddle announced the completion of the membership of all committees.

The secretary was instructed to bring to the attention of the Accountants' executive committee the cost analysis methods set forth in the 1928 report of the committee on bus operation, and the 1929 report of the committee on the equipment and suggest the desirability of collaboration between the Accountants' and the Transportation and Traffic Associations in completing the study of such methods.

In the matter of the nomination and election of officers by the association at its convention it was decided that the election should take place at either the first or the second meeting rather than at the last session as is the present practice.

C. W. Wilson of the committee on the movement of the vehicle was instructed to elaborate to some extent on the work done by the previous committee and to give particular attention to the studies for the purpose of making recommendations on suitable parking regulations under various conditions. The committee was also instructed to study automobile registration in cities and its effect upon public transportation. W. W. Holden, chairman of the committee on "the passenger," said the work of his committee would depend largely on whether the employment of a specialist was authorized by the executive committee. The committee wanted to employ a well-known authority for making analyses in a selected group of cities, and unless this can be provided for, it will be necessary for the members of the committee to conduct the investigation only in the communities in which they reside.

A. C. Spurr, who is chairman of the committee on the "small city," stated that a sub-committee on procedure had been appointed and that this year special attention would be given to the subject of return on new capital invested and the results obtained with various fare systems in use. Committee members are to furnish data for their own properties and in addition each will visit several other properties to obtain such information as is available.

C. D. Smith, chairman of the committee on the transportation employee, said that this committee will give special attention to the subject of training from the standpoint of accident prevention, including the conference training method, job analysis, etc.

It was agreed to accept the invitation of Mr. Holden to hold a meeting in San Antonio on March 3, 1930.

NEWS BRIEFS

Continued from Page 54

South Bend, Ind.—Steadily increasing patronage has unqualifiedly approved the operation of Chicago, South Shore & South Bend Railroad de luxe trains. Reports show that the traveling public indorses the operation of parlor cars on dining car trains, for parlor car patronage on de luxe trains has increased from month to month since the line instituted this service last July.

✦

Trenton, N. J.—The Trenton Transit Company has been organized as the successor to the Trenton & Mercer County Traction Corporation. The new company really represents the consolidation of the railway with its former bus subsidiary, the Central Transportation Company.

✦

Allentown, Pa. — A bill for foreclosure of the first mortgage of $150,000 on the property of the Bethlehem & Nazareth Passenger Railway has been filed in the United States District Court at Philadelphia by the Guaranty Trust Company, New York, trustee for the bondholders. The bill was filed because the company defaulted in payment of bonds which matured May 1, 1929. The railway is being operated under lease by the Lehigh Valley Transit Company.

✦

Chicago, Ill.—The Illinois Commerce Commission on Dec. 18 approved the issuance by the Chicago, North Shore & Milwaukee Railroad of $700,000 Series G equipment trust certificates partially to cover the cost of 25 additional all-steel motor cars, delivery of which is to start on Feb. 1. It also approved the issuance of $522,000 first and refunding mortgage 5½ per cent bonds to reimburse the company treasury for expenditures made in the latter part of 1929 for improvements.

✦

New Orleans, La.—Racing fans desiring quick and efficient transportation to the tracks this season are invited to use the service of the Orleans-Kenner Traction Company, Inc., which is one of the quickest in the city and has an added advantage in that its cars stop only a few feet from the grandstand entrance of the race track. L. J. D'Aubiu, general superintendent of the Orleans-Kenner Traction Company, has made the most of this, realizing that patrons want speedy, efficient and comfortable service, which the company renders.

✦

Hampton, Va—Norman E. Drexler, general manager of the Public Service Company, has asked the Hampton City Council for permission to substitute buses for trolley cars on the east Hampton line.

✦

Jamestown, N. Y.—The Jamestown Motor Bus Transportation Company, a subsidiary of the Jamestown Street Railway, plans to extend its Fairmount Avenue line from the present terminus in Lakewood, N. Y., to the village of Ashville, making the one-way distance of that line 9 miles, instead of 6 as at present. The Jamestown Street Railway will continue its service between Jamestown and Ashville, the bus line being intended to augment the trolley service.

Portsmouth, Ohio—The Public Utilities Commission has authorized the Portsmouth Public Service Company to abandon service for a period of one year over its interurban line between Portsmouth and Ironton. The abandonment will be effective after 30 days notice to the public.

✦

Springfield, Mass. — A through bus service from Springfield to Boston, Mass., is to be started about Jan. 8 by the Springfield Street Railway in conjunction with the Worcester Consolidated and the Boston, Worcester & New York companies. Three round trips daily are proposed. This service is in addition to buses already in operation by the same agencies and will follow routes already authorized by state and municipal authorities, with the exception of a minor change in Springfield.

✦

San Diego, Cal.—The San Diego Electric Railway has notified the Councils of San Diego and National City that it has applied to the Railroad Commission for authority to abandon its lines and to remove the tracks from 32nd Street and Newton Avenue, San Diego, and thence on a private right-of-way to Dalbergia Street and National Avenue, thence on National Avenue along the pike to National City, thence on National Avenue to Twelfth Street and on Twelfth Street, National City, to a junction with the San Diego & Arizona Railroad. The company recently acquired the Sutherland Stages operating between National City and San Diego.

✦

Brooklyn, N. Y.—Irving Lee Bloch, vice-president of the Long Island Title & Guarantee Company, suggests the building of a four-track subway underneath the Atlantic Avenue route of the Long Island Railroad, the tearing down of the existing railroad tracks and the rebuilding of Atlantic Avenue into a motor parkway with direct egress from Jamaica, and the connection of such a Jamaica-Brooklyn subway system at the existing Flatbush Avenue terminal with the existing systems leading to other parts of Brooklyn and Manhattan.

✦

Kansas City, Mo.—Due to the Kansas City election and delay in the state valuation of the Kansas City Public Service Company, the street car fare issue before the Public Service Commission is about to be continued into April. The company has a 10-cent fare schedule on file at Jefferson City and the last six-month suspension ordered by the commission expires on Jan. 12. The Missouri statutes permit the commission to suspend a filed schedule twice before it must be denied or affirmed. Valuation will probably be completed in February.

✦

St. Louis, Mo. — The General Cab Company of Kansas City, and Los Angeles, Cal., on Jan. 4 will begin operations in St. Louis with a fleet of 54 Ford taxicabs. The fare will be 10 cents for flag pull and 10 cents for each additional half-mile compared with a 25-cent flag pull and 10 cents for each two-fifths of a mile charged by other companies in the St. Louis field. The new taxicab company plans to increase its fleet to 100 cars within a very few months.

Digitized by Google

Receivers for Albany, Syracuse and Rochester Lines

Federal Judge Frederick H. Bryant, at Malone, N. Y., on Dec. 28 appointed receivers for the United Traction Company of Albany, Troy and Cohoes, and for the New York State Railways, serving Rochester, Syracuse and Utica and owning lines running between Rochester and Little Falls.

Harry Weatherwax and Neil F. Towner, both of Albany, were named receivers for the United Traction, while Benjamin E. Tilton of Utica, and Wallace Pierce of Plattsburgh were named receivers for the New York State Railways.

The receivership was forced by an action of the General Finance Company, which alleged that United Traction owed about $195,000 on one note and $3,500,000 on another. The company also had some miscellaneous debts, it was stated, amounting to about $100,000. There was a mortgage of $420,000 due on Jan. 1 and some miscellaneous interest. The United Traction is said to have an accumulated deficit of about $10,000,000. Earnings for the last year were represented by counsel for the plaintiff as showing a deficit of more than $600,000. The allegation also asserted that the company had defaulted interest amounting to $80,000 on Nov. 1.

The Finance Company stated that the New York State Railways owed about $400,000 on open accounts and about $260,000 on labor claims and taxes.

Robert C. Watson, president of the Rochester Trust & Safe Deposit Company and member of the protective committee formed by bondholders of the Rochester Railway, which was taken over by the New York State Railways, characterized the receivership as a "smart move by the management of the railway lines to gain more time" and he said that the activities of the protective committee will be pressed with the greatest vigor. He said that he would make no attempt to interpret the legal phases of the receivership, but he viewed it as another means of "intimidating the bondholders to accept an unreasonable and unfair offer of conversion of their securities into those of the Association Gas & Electric Company." He is said to have charged that the attitude of the present management of the railways toward the bondholders shows that they are "wreckers, not builders."

J. H. Pardee, chairman of the New York State Railways, has sent a letter to the bondholders of the Rochester Railway outlining the status of the holders under the terms of the mortgages covering that property. The statement is technical and mostly of direct interest to the actual holders of the securities, but the following excerpt is of general interest:

"The service-at-cost plan expires on July 31 next. The plan provided that, if it were to be extended, notice of extension should be filed one year before the expiration date. No notice of extension was given and so far as we know there is no assurance on the part of the city of Rochester that it will extend the service-at-cost plan for any further period. If it is not extended and the Quimby decision upholding a 5-cent fare is held binding, the situation will be serious. We have had a statement made up showing the 5-cent fare applied to the number of revenue passengers carried for the year ended October, 1929, to see what the income statement would be if that fare had been in effect throughout the twelve-month period, with these results:

Operating expenses, maintenance, depreciation and taxes	$3,920,817
Operating revenue, other income	2,775,758
Operating loss before provision for bond interest	1,145,059

"The erroneous impression also seems to prevail that the Rochester Railway lines can be seized by the Rochester Railway first and second mortgage bondholders and operated independently of the New York State Railways. This cannot be done since substantial amounts of the equipment, as well as other property necessary for operation in Rochester, is subject to the first lien of our consolidated mortgage."

Under date of Dec. 21, 1929, H. C. Hopson, president of the Associated Gas & Electric Securities Company, which made an offer of exchange to bondholders, issued a statement in which he referred to the dangers of receivership. After reviewing briefly the history of the electric railway Mr. Hopson says that "most astute bankers and able students have for years worried about its future and greatly doubted its ability to survive. It came to be true some time ago that no well-informed person willingly invested a dollar in street railway securities unless he got the best security available at the time, and then only on a basis which he thought would compensate him for the risk being taken."

It seems that the Associated Gas & Electric System did not want the transportation system; that in fact it "unavoidably became the largest security holders of the traction system." Mr. Hopson says:

"As a result of acquisitions of electric and gas properties a few months ago, our interests also unavoidably became the largest security holder of the traction system in which you are a bondholder. We did not value our interest at much, if anything, but on the other hand our predecessors with less experience in the industry than ourselves had hope for it. Their advisors and the operators in charge of the properties were still optimistic that something might come about or be done to change the course of events. * * * It is obvious that those who have purchased securities of an interprise which is primarily engaged in the light and power business cannot be expected to be willing to have their money invested in another industry about which most investors feel decidedly pessimistic."

Later the offer of exchange for Albany Railway 5's was made 90 per cent of the face value instead of 40 per cent. Circulars to Albany Railway holders explained the change by saying that since the offer of 40 was made, "we have made a more extensive investigation of the operations of the company and of the value of the real estate subject to the lien of the mortgage securing the bonds which you hold." The new offer is made retroactive.

Conspectus of Indexes for December, 1929

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares* 1913 = 4.84	Dec., 1929 7.78	Nov., 1929 7.78	Dec., 1928 7.71	Nov., 1929 7.78	Nov., 1924 7.24
Electric Railway Materials* 1913 = 100	Dec., 1929 144.9	Nov., 1929 145.7	Dec., 1928 145.5	Dec., 1926 159.2	Feb., 1928 139.5
Electric Railway Wages* 1913 = 100	Dec., 1929 231.1	Nov., 1929 231.1	Dec., 1928 229.8	Nov., 1929 231.1	Dec., 1924 220.8
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	Dec., 1929 205.1	Nov., 1929 204.8	Dec., 1928 205.1	Nov., 1928 205.7	July, 1929 199.0
General Construction Cost Eng'g News-Record 1913 = 100	Dec., 1929 209.5	Nov., 1929 208.5	Dec., 1928 210.2	Jan., 1927 211.5	Nov., 1927 202.0
Wholesale Commodities U. S. Bur. Labor Stat. 1926 = 100	Nov., 1929 94.4	Oct., 1929 96.3	Nov., 1928 96.7	Nov., 1925 104.5	Apr., 1927 93.7
Wholesale Commodities Bradstreet 1913 = 9.21	Dec., 1929 12.24	Nov., 1929 12.40	Dec., 1928 13.15	Dec., 1925 14.41	Dec., 1929 12.24
Retail Food U. S. Bur. Labor Stat. 1913 = 100	Nov., 1929 157.9	Oct., 1929 160.5	Nov., 1928 157.3	Nov., 1925 167.1	Apr., 1925 150.8
Cost of Living Nat. Ind. Conf. Board 1914 = 100	Nov., 1929 163.0	Oct., 1929 163.4	Nov., 1928 162.6	Nov., 1925 171.8	Apr., 1929 159.3
Industrial Activity Elec. World, kw.-hr. 1923–25 = 100	Nov., 1929 122.9	Oct., 1929 134.6	Nov., 1928 135.0	Feb., 1929 140.4	Aug., 1925 94.3
Bank Clearings Outside N. Y. City 1926 = 100	Nov., 1929 111.2	Oct., 1929 111.8	Nov., 1928 104.0	Oct., 1929 111.8	Dec., 1924 90.07
Business Failures Number	Nov., 1929 1536	Oct., 1929 1511	Nov., 1928 1568	July, 1929 1581	Sept., 1928 1348
Liabilities, Millions of Dollars	53.86	29.51	54.23	102.09	23.13

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Digitized by Google

Another Hearing on Rochester-Buffalo Service

Opposition on the part of the International Railway and the Buffalo Transit Company, Buffalo, to the application of the Rochester, Niagara Falls & Buffalo Coach Lines, Inc., for a certificate to operate buses between Rochester and Buffalo has prompted the Public Service Commission to adjourn the hearing again until Jan. 20.

Much of the testimony taken by Commissioner Pooley at the first adjourned hearing held in Buffalo centered about losses that the International Railway would sustain should it be deprived of the interchange of traffic with the Rochester, Lockport & Buffalo trolley line at Lockport. The Buffalo Transit Company, which now operates buses between Lockport and Buffalo, wants the Rochester, Niagara Falls & Buffalo Coach Lines, Inc., restricted from carrying local passengers in territory now covered by its bus system.

The capitalization of the proposed new bus line is $100,000. Authority is asked by the Rochester, Lockport & Buffalo Railway for permission to acquire the entire capital stock.

Substitution in Fishkill

The Public Service Commission has granted a petition by the Fishkill Electric Railway to substitute buses for trolley cars on part of its system in Beacon, N. Y., the city consenting to the substitution. Operation of trolley cars between Beacon and Fishkill will be continued. It is the intention of the company to supplement the bus operation by trolley cars when necessary, especially in the summer season. The company plans to put five buses in operation. The substitution, it is stated, will make for freer movements in the streets and a seven-minute headway, in place of the present ten-minute headway will be placed in operation. There will be no change in the existing fares, nor lessening of the number of scheduled trips.

Electric Railways Eliminated from Grade Crossing Removal Costs

The special commission created by the Legislature of Massachusetts to investigate the abolition of grade crossings has filed its final report with the General Court. The report recommends the establishment of an entirely new method for the abolition of such crossings. In brief, the special commission would give entire control of the work to the State through the Public Utilities Commission. A second innovation would be in the apportionment of the cost, which a majority believes should be so distributed that the state would pay 35 to 40 per cent, the railroad 50 per cent, the city and town not less than 5 per cent or more than 10 per cent, while the county may be assessed from nothing to a maximum of 10 per cent.

The report recommends the elimination of the electric railways from the cost assessments. It says:

"Because of the financial condition of the electric railways of the state, their decreasing revenues from rail service and the rapid trend toward bus service, these corporations have been eliminated from sharing in the costs, except under the voluntary agreement section. The electric railways will, however, pay for any changes in rails, poles or wires made necessary through change of grade or location due to the abolition of a grade crossing."

Rehearing Asked in Los Angeles Case

The City of Los Angeles and the California Railroad Commission on Dec. 23 appealed to the United States Supreme Court for a rehearing of the case in which the high court upheld a fare increase from 5 to 7 cents.

Early in December the Supreme Court handed down a decision granting the Los Angeles Railway the fare increase. A federal order previously had put the 7-cent fare into effect pending settlement of the suit. In petitioning for a rehearing of the case, the joint petition filed with the high court alleges the court erred in its decision on three grounds:

1. In holding that the city did not have power to prescribe franchise rates.
2. In not holding that the franchise rates would be binding to the railway if the California law was silent on the subject.
3. In holding that the California Railroad Commission had assumed jurisdiction over fares in 1921 and 1928.

The petitioners asserted that the court's decision "is constantly unsound and at direct variance with many decisions of it and other courts referred to in the brief of appellant."

The "Home Telephone case," relied upon in the court's majority opinion, is not applicable to the fare case, the petitioners contend. In that case it was held that the city did not have continuing power to regulate phone rates by prescribing rates in a charter, it was stated. The Los Angeles Railway filed its objection to a rehearing a few hours after the city-state petition was lodged with the court.

Justices Brandeis, Holmes and Stone dissented when the high court handed down its six-to-three opinion on Dec. 2. Justice Butler delivered the majority opinion. Both sides in the case are said to have admitted a 5-cent fare was not compensatory. The minority dissenting opinion stated that the high court exceeded its powers in interpreting the law of California as to whether the city had the right to contract for a fixed 5-cent fare.

Feeder Bus Controversy Settlement Ahead in Chicago

The controversy over the operation of feeder buses by the Surface Lines in Chicago's outlying districts, especially on the northwest side, may come to an end on Jan. 7 after two years of dispute. On that day a committee of Chicago Aldermen will appear before the Illinois Commerce Commission with a petition for more than 90 miles of routes. All indications are that their plea will be treated favorably. This would provide residents of the northwest side with a 7-cent feeder bus fare, with railway transfer privileges, as against the Chicago Motor Coach company's 10-cent fare without transfers.

After everything seemed well on the way to settlement, it became known on Dec. 30 that the Surface Lines plan to go before the commission on Jan. 14 with a request for authority to operate trolley buses on Diversey Avenue and motor buses on Belmont Avenue. Whether or not other service is contemplated is not known. In order to run the trolley buses the company must satisfy the city and the commission that this new type of transportation will be adequate, efficient and economical. Since the north side lines are in receivership, Federal Judge Wilkerson is in a position to prevent the lines from spending more money should the security holders take action.

Morgan Report Awaited at Detroit

A report showing that the Detroit Municipal Railway is being operated at a loss, despite the monthly financial statements indicating a profit, has been prepared by John H. Morgan, auditor, says the *Free Press*.

As Mr. Morgan explained the matter, he had made a report on questions raised by Senator Couzens and transmitted to him by Frank Couzens, member of the Street Railway Commission. He also said that he had completed a report on railway department insurance, and was working out a plan for figuring the depreciation on the equipment of the system.

As Mayor of Detroit in 1921 Senator James Couzens brought about the consolidation of all lines under city management. Since then he has shown a keen interest in the manner in which the system operated. The appointment of his son, Frank, to the Detroit Street Railway Commission, followed closely the primary election in October and the resignation of G. Ogden Ellis, who had served for many years as chairman.

Mr. Morgan stated in a meeting a few weeks ago that not one bus line was earning money. It is expected that the Morgan report will become an active issue just as soon as Mayor-Elect Charles Bowles takes office on Jan. 14.

New Edition of Engineering Manual Ready Soon

The 1929 edition of the Engineering Manual, which is the electric railway man's handbook of standards, recommended specifications, designs, methods, etc., and miscellaneous methods and practices that have been approved by the American Electric Railway Engineering Association, is in preparation.

It is very desirable that all users of the Engineering Manual obtain the 1929 issue, so that errors will not be made in using specifications that have been revised, withdrawn or superseded. Even when accompanied by the 1927 and 1928 supplements the 1926 edition cannot be brought up-to-date, since the revised and added material approved during 1929 would not be included. All new material from the past year in the new edition of the Manual has been printed there without first appearing in any supplements.

Several months ago association headquarters distributed an order blank to every operating member company. In addition, every holder of the 1926 edition will receive a separate letter, calling attention to the new edition. Others who desire the Manual may address their requests to association headquarters.

No price on the new edition has been definitely set, but it is probable that the cost will not change from that for the 1926 edition, i.e., $7.50 per copy to members and $10 to non-members.

Digitized by Google

PERSONAL MENTION

B. E. Tilton President of New York State Railways

Succeeds James F. Hamilton as Chief Executive at Rochester. E. K. Miles Manager in Syracuse. Many Other Changes on Central New York Systems

IMPORTANT changes in the executive personnel of the New York State Railways, made necessary by the resignation of James F. Hamilton as president, have been announced. Mr. Hamilton leaves the electric railway industry to become head of a large aircraft combine, the Aviation Corporation of America.

Benjamin E. Tilton, Syracuse, first vice-president, succeeds Mr. Hamilton as president.

H. B. Weatherwax, for many years vice-president of the United Traction Company, operating in the Capitol district, becomes president of the United Traction Company and the Schenectady Railway, posts formerly held by Mr. Hamilton.

Ernest Murphy, general manager of the United Company, will continue in that capacity, taking in addition the position of general manager of the Schenectady company.

Roy R. Hadsell, in charge of operations of the Schenectady company, becomes manager of that system and Ernest K. Miles, superintendent of transportation at Syracuse, will be appointed general manager of the Syracuse lines.

John F. Uffert, general superintendent of transportation and equipment of the Rochester lines, becomes general manager of the system in that city.

J. N. Jones, superintendent of transportation at Utica, is promoted to be general manager there. Howard L. Reichart, secretary-treasurer, and Joseph M. Joel, general auditor of the group, remain in the same positions.

Headquarters of the New York State Railways will remain in Rochester.

Besides being president of the New York State Railways, Mr. Hamilton was president and a director of eighteen subsidiary bus and railway companies, all controlled by the Associated Gas & Electric Company, with headquarters in New York.

William F. Stanton, assistant to Mr. Hamilton, will go with his chief to the new post.

Mr. Hamilton, now in his 52d year, began his career in the electric railway field as a motorman on the International Railway lines in Buffalo. He went to Rochester in 1917. Previously he was assistant superintendent of the Schenectady Railway, rising to the presidency in 1909. In 1911 he became general superintendent of the United Traction Company of Albany and in the following year general manager of both the United and Schenectady lines. He went to the New York State Railways as general manager. In 1918 he was made vice-president and assumed the presidency a few months later.

During his regime, the service-at-cost contract was negotiated between the city of Rochester and the railways. This grant has been in effect for the past ten years.

It was said of Mr. Tilton as far back as 1922 that no task is ever likely to master

B. E. Tilton

him that can be accomplished by the application of a combination of tact, tenacity and technology. Mr. Tilton brought all three of these adjuncts to bear on his first job down in Porto Rico with the government service making geodetic and coast surveys and he has been using the combination with success ever since. And with every new application of them by Mr. Tilton has come added ease in their use and greater success to their possessor through their application.

The government work in Porto Rico was Mr. Tilton's first job after he was graduated from Cornell in 1897. He was in Porto Rico for three years. And then came to Mr. Tilton the call of private enterprise. It was a loud call, and he heeded it to become engineer of construction of the Pennsylvania Lines West and was located at Fort Wayne and Cleveland for six years. At Cleveland Mr. Tilton's fine work attracted the attention of the management of the Cleveland Railway and he was induced to join the select circle of very able men who administer that property. His title there was engineer of maintenance of way. Then and there Mr. Tilton was won over to the electric railways. His next connection was with the Rochester Railway & Light Company as engineer of maintenance of way of city and suburban lines. The Rochester lines are tied in with the New York State Railways and so it was in reality only a step for Mr. Tilton in his upward climb to go from the post in Rochester to the position of general manager of the Syracuse Rapid Transit Company, Utica & Mohawk Valley Railway and the Oneida Railway. His election as vice-president followed quite logically. In this dual post at Syracuse Mr. Tilton had jurisdiction over the Oneida and the Utica lines. He is steeped in a knowledge of the history and affairs of the New York State Railways and his selection for the post of president followed just as logically as did his other promotions with the company.

J. F. Hamilton

✦

F. J. Tew in Another Foreign Post

F. J. Tew has resigned as superintendent of shops and equipment of the Sacramento Northern Railway, Sacramento, Cal., to accept a position with Emprezas Electricas Brasileiras, S. A., at Rio de Janeiro, Brazil, South America.

Mr. Tew received his early training in electric railway work with the Twin City Rapid Transit Company, being employed in the Snelling Avenue shops from 1904 to 1912 inclusive in various capacities in the different departments.

In November, 1912, he accepted the position of superintendent of shops and carhouses with the Manila Electric Railroad & Light Company at Manila, P. I., where he remained until 1920, at which time he returned to the United States.

Upon his arrival in California from Manila, Mr. Tew accepted the position of superintendent of shops with the Sacramento Northern Railway. At both Manila and Sacramento he was in entire charge of all mechanical and electrical shop work in connection with the maintenance of rolling stock, including city, suburban, interurban passenger and freight cars and heavy electric locomotives.

✦

C. J. Quill With North Coast Company

C. J. Quill has succeeded H. R. Leigh as superintendent of the North Coast Transportation Company, Seattle, Wash. Mr. Quill's transportation experience dates back to June, 1912, when he entered the employ of the Tacoma Railway & Power Company. He continued with this company until he enlisted for military service in 1917. Returning from military duty he re-entered the service of the Tacoma Railway & Power Company, which he served in several positions. In February, 1927, he was made general passenger agent for the North Coast Lines. On June 1, 1927, he was appointed assistant superintendent of the North Coast Lines, in which capacity he has since continued.

✦

G. S. Wills, former general manager of the Wheeling Traction Company, Wheeling, W. Va., and former general superintendent of the Steubenville, East Liverpool & Beaver Valley Traction Company, is now associated with the Pharo Engineering Company, Pittsburgh, Pa.

Digitized by Google

W. T. Rossell Vice-President of New Brooklyn System

W. T. Rossell, who has been general manager of the Pittsburgh Railways, Pittsburgh, Pa., has resigned to become vice-president of the Brooklyn & Queens Transit Corporation, Brooklyn, N. Y., which includes more than 500 miles of surface railway making up the Brooklyn City Railroad and the surface lines of the Brooklyn-Manhattan Transit Corporation.

Mr. Rossell has served as general manager at Pittsburgh since September, 1926. He succeeded F. R. Phillips in that post. He had previously been superintendent of way of the Pittsburgh Railways and general superintendent in charge of maintenance. He is another official schooled in engineering who has demonstrated his managerial ability.

The new Brooklyn vice-president was born in Memphis, Tenn., and was educated at Staten Island Academy, Staten Island, N. Y., from which he was graduated in 1904. Later he entered the United States Military Academy at West Point. In

W. T. Rossell

August, 1908, he became assistant engineer of track and structures for the Cincinnati Traction Company and the following year was connected with the York Manufacturing Company, York, Pa. In October, 1909, he returned to the Cincinnati Traction Company where he remained until 1916 when he became superintendent of track and structures for the Cincinnati, Newport & Covington Railway, operating out of Covington, Ky. Following his discharge from the army in June, 1919, as a captain of engineers, Mr. Rossell returned to the Cincinnati, Newport & Covington Railway as superintendent of way and structures, in which capacity he continued until his appointment as superintendent of way of the Pittsburgh Railways in July, 1924.

Thomas Fitzgerald, who has been vice-president of the Pittsburgh Railways, Pittsburgh, Pa., takes over in addition the title of general manager.

✦

Billy Mathewson Retires After Forty Years

Billy Mathewson of the United Electric Railway, Providence, R. I., has retired on pension. Mr. Mathewson entered the employ of the old Union Railroad in May, 1884, as a horse car driver, reporting at the Olneyville carhouse. After about five years service as a driver, he became assistant to Ellis R. Swan, superintendent at Olneyville at that time. Mr. Mathewson continued in this position until 1902, at which time he became superintendent of the Olneyville carhouse under the late Robert I. Todd, then general manager. He was superintendent of this carhouse for about fifteen years, going to the Riverside division in 1917. From Riverside Mr. Mathewson took charge of the newly established East Providence Division on March 30, 1924.

Mr. Mathewson continued there until November, 1926, when he took charge of the Mount Pleasant division upon the retirement of B. D. Sweet. He remained in the Mount Pleasant division until he retired on pension.

✦

L. E. Thorne With Gulf States Utilities

Lawrence E. Thorne, general superintendent of the Northern Texas Traction Company, will take charge of the Port Arthur division of the Gulf States Utilities Company, Fort Worth, Tex., a Stone & Webster subsidiary. Mr. Thorne studied electrical engineering at Texas Agricultural and Mechanical College. He entered the employ of the Northern Texas Traction Company in 1911 as chain man in a survey gang. He received rapid promotion and with the transfer in 1925 of General Superintendent V. W. Berry to the Virginia Power & Light Company, Mr. Thorne was made general superintendent of the local company.

✦

Messrs. Davis, Savage and Sherman With Car Company

C. E. Morgan, president, has announced a number of changes in the personnel of the Cincinnati Car Company, Cincinnati, Ohio. Lewis J. Davis has been made assistant to the president; Hugh Savage, superintendent of production, and Hugh K. Sherman, purchasing agent. The appointments as announced in an official bulletin are as follows:

L. J. Davis, assistant to the president, in charge of engineering and production, vice J. H. Elliott resigned.

Hugh Savage, superintendent of production, reporting to Mr. Davis.

C. J. Ellis, chief engineer, reporting to Mr. Davis.

H. K. Sherman, purchasing agent, in charge of the purchase of materials and supplies, as well as the handling and disposing of scrap and other materials. Mr. Sherman will also have charge of the general storeroom.

F. A. Latscha, assistant purchasing agent, reporting to Mr. Sherman.

C. F. Schnittger, general storekeeper, reporting to Mr. Sherman.

R. MacDonald, in charge of the service department.

A. L. Kasemeier continuing as vice-president, in charge of sales department.

Mr. Davis was assistant to Mr. Morgan as general manager of the Brooklyn City Railroad and, with the merging of the Brooklyn City lines with the Brooklyn-Manhattan Transit Corporation, became car engineer under William G. Gove.

Mr. Savage was formerly superintendent of equipment of the Brooklyn City Railroad, and before going to Brooklyn was superintendent of shops of the Detroit United Railway.

Mr. Sherman was purchasing agent of the Brooklyn City Railroad from Nov. 1, 1925, to July 1, 1929. Previous to that he was purchasing agent of the Michigan Electric Railway and the Michigan Railroad.

W. H. Gibson Purchasing Agent in Brooklyn

William H. Gibson has been appointed purchasing agent of the Brooklyn-Manhattan Transit system, to succeed the late Lincoln Van Cott. Mr. Gibson became connected with the Brooklyn companies in October, 1903, and advanced through the ranks in the purchasing department to his present position.

Mr. Gibson was born in Belleville, N. J., 49 years ago and after completing courses at the Belleville schools and a Newark business school he entered the employ of the Sprague Electric Company as a stock clerk. During his employment with the Sprague Company, Mr. Gibson advanced to the position of storekeeper and then accepted a similar position on the Manhattan Elevated Railway in New York City. He remained with the Manhattan "L" system for two years and then joined the staff of a hardware firm located in Manhattan.

In October, 1903, Mr. Van Cott selected Mr. Gibson to take charge of the store

W. H. Gibson

room at East New York for the Brooklyn Rapid Transit Company, predecessor to the present company. This was shortly after the consolidation of the Kings County "L" lines and the Brooklyn Union "L" lines as part of the Brooklyn Rapid Transit system. The work of converting the old "L" cars for electrical operation was then in progress at East New York and Mr. Gibson remained in charge of the storeroom there until the completion of that work.

He then spent a year on the staff of the late John F. Calderwood, general manager of the B. R. T. system at that time. Later he was appointed assistant general storekeeper for the B. R. T. system, under C. S. Waters, storekeeper. In 1906, when Mr. Waters took charge of the storerooms of the New York Municipal Railway Corporation following the signing of the dual subway contracts with the city of New York, Mr. Gibson was made general storekeeper. He was finally advanced to the position of assistant purchasing agent and general storekeeper in 1920 and continued as Mr. Van Cott's assistant until the latter's death.

✦

R. A. Pritchard, assistant superintendent of the railway at Little Rock, Ark., has been decorated with a pin denoting 25 years of service with the railway department of the Arkansas Power & Light Company. Mr. Pritchard entered the service of the railway in 1904 as conductor. Prior to that, at the age of nineteen, he went to work at a carhouse

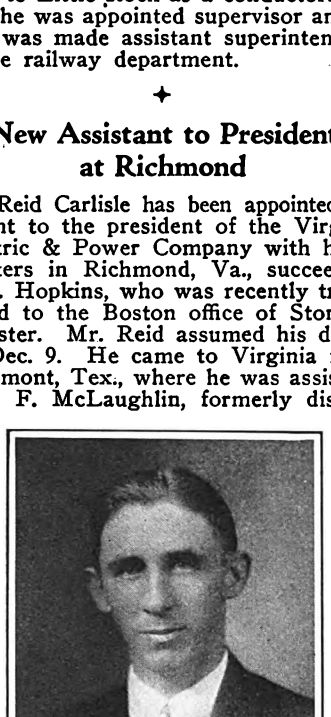
Digitized by Google

in Knoxville, Tenn. At the time of the Spanish-American War he volunteered for service with Company F, First Alabama Infantry. He served under Gen. Fitzhugh Lee, of the 27th Corps, and helped clear the site for Miami, Fla., while the troops were there. After the close of the Spanish-American War he went to Little Rock as a conductor. In 1911 he was appointed supervisor and in 1923 was made assistant superintendent of the railway department.

✦

New Assistant to President at Richmond

I. Reid Carlisle has been appointed assistant to the president of the Virginia Electric & Power Company with headquarters in Richmond, Va., succeeding R. C. Hopkins, who was recently transferred to the Boston office of Stone & Webster. Mr. Reid assumed his duties on Dec. 9. He came to Virginia from Beaumont, Tex., where he was assistant to J. F. McLaughlin, formerly district



I. R. Carlisle

manager in that territory, and recently promoted to be vice-president of the Stone & Webster organization, with offices in Boston.

✦

Herman Russell Succeeds the Late Robert M. Searle

Herman Russell, for seven years executive vice-president of the Rochester Gas & Electric Corporation, Rochester, N. Y., has been named president of the company to succeed the late Robert M. Searle.

Mr. Russell, a native of Michigan, has been connected with the gas and electric corporation and its predecessor, the Rochester Railway & Light Company, for 23 years.

A graduate of the University of Michigan, he entered the public utility field with the Detroit Gas Company in 1900. Two years later he was made assistant superintendent of that company.

In 1903 he became superintendent of the gas manufacturing plant of the San Francisco Gas Company and a year later went to Cincinnati to take the post of assistant superintendent of the Cincinnati Gas & Electric Company.

For eight years, from 1906 to 1914, Mr. Russell served as assistant superintendent in Rochester, being elevated to the superintendency of the gas division in the latter year. He was appointed general manager in 1919 and was elected vice-president and director in 1922.

J. A. Davis

J. A. Davis Assistant at Norfolk

John A. Davis, Jr., who came to the Virginia Electric & Power Company in the capacity of a student engineer two years ago, has been promoted to be assistant to F. Carter Womack, manager of transportation in Norfolk, Va., in which territory service by electric railway and bus is co-ordinated. Mr. Davis left Richmond on Dec. 9 to assume his new duties. He is a native of Richmond and a graduate of the Virginia Polytechnic Institute. He joined the Stone & Webster forces in 1927. Mr. Davis formerly held the post of acting assistant to the president of the company, taking over the work of R. C. Hopkins, who was recently transferred to Boston and who on Dec. 9 was succeeded by I. Reid Carlisle.

✦

S. L. Williams Promoted by Westinghouse Air Brake

S. L. Williams has been appointed district engineer for the Eastern district of the Westinghouse Air Brake Company at New York. Mr. Williams was graduated from the Massachusetts Institute of Technology as a mechanical engineer in 1923, and immediately entered the employ of the Westinghouse Air Brake Company as special apprentice in the Wilmerding works. After serving for several months as inspector in Boston and New York, he was made assistant to the district engineer at the latter place in 1925. In 1928 he was transferred to the West Coast and promoted to be assistant district engineer of the Pacific District at San Francisco. This position he held until his recnt promotion.

S. L. Williams

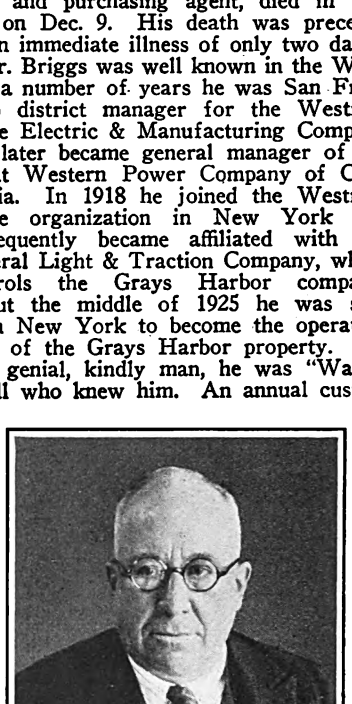
OBITUARY

W. W. Briggs

Wallace W. Briggs, since 1925 vice-president in charge of operation for the Grays Harbor Railway & Light Company, Aberdeen, Wash., and also general manager and purchasing agent, died in that city on Dec. 9. His death was preceded by an immediate illness of only two days.

Mr. Briggs was well known in the West. For a number of years he was San Francisco district manager for the Westinghouse Electric & Manufacturing Company and later became general manager of the Great Western Power Company of California. In 1918 he joined the Westinghouse organization in New York and subsequently became affiliated with the Federal Light & Traction Company, which controls the Grays Harbor company. About the middle of 1925 he was sent from New York to become the operating head of the Grays Harbor property.

A genial, kindly man, he was "Wally" to all who knew him. An annual custom



W. W. Briggs

of his was to give a "Kids' Party" in the Electric Park power station grounds on his birthday to all the children of the community.

Mr. Briggs had become a very important figure in his community in the last four years, taking an active interest in civic affairs.

✦

Hugh A. Siggins, whose father, the late David Siggins, in 1892 incorporated the Warren Street Railway and the Warren & Jamestown Street Railway, Warren, Pa., died on Dec. 24 after a brief illness. With the retirement of his father from active management of the transportation lines, Mr. Siggins headed the two companies until they were sold to the Associated Gas & Electric Company several years ago. He was 52 years of age.

✦

Ormel W. Pierce, founder and president of the Railroad Trolley Guard Company, Olean, N. Y., died at his home in that city on Dec. 28, following a short illness. He was also head of the Olean Tile Manufacturing Company and was an officer of a number of other local industrial concerns. He was 63 years old.

✦

Mrs. Carrie Alexander Bahrenburg, widow of Henry Alexander, founder of the local railway at Belleville, Ill., and its operator for several years after her husband's death, died in Belleville, on Nov. 24. She was 68 years old.

Digitized by Google

INDUSTRY MARKET AND TRADE NEWS

Big Merger in Car Building Field

Plans involving an important expansion in the manufacturing activities of the Pullman company, through the acquisition by purchase of the Standard Steel Car Company and the Osgood Bradley Car Company have been announced, the entire transaction calling for an exchange of stock and cash to the amount of $50,000,000. Action on the merger will probably be confirmed at a meeting of the stockholders of Pullman, Inc., to be held in Wilmington, Del., on Jan. 28.

Standard Steel Car and Osgood Bradley Car own and operate plants manufacturing railway passenger and freight cars, street railway cars, steel forgings, gray iron castings, etc., at the following locations: Butler, Pa.; Hammond, Ind.; Baltimore; St. Paul; Richmond; Worcester; Sagamore, Mass.; Elwood City, Pa.; La Rochelle, France; and Rio de Janeiro. Besides these properties, Pullman, Inc., is acquiring sales offices in New York, Chicago, Pittsburgh, St. Paul, Baltimore, Richmond, London, Paris, Rio de Janeiro, Sao Paulo, Buenos Aires and Cape Town. The Middletown Car Company owns and operates a car assembling plant at Rio de Janeiro, while Entreprises Industrielles Charentaises owns and operates a freight and passenger car plant at La Rochelle, France, equipped to handle a general export business.

Lands and Buildings Included

In addition to the manufacturing plants and sales offices, Pullman, Inc., is acquiring certain lands, housing properties, owned by Standard Steel Car or subsidiaries. The inventories, receivables, etc., connected with the manufacturing plants are to be acquired for cash or equivalent in securities.

The properties being acquired will be operated by a newly incorporated subsidiary of Pullman, Inc., to be wholly owned by that company but to be operated separately from the Pullman's present manufacturing subsidiary, the Pullman Car & Manufacturing Corporation.

Entrance of the Mellon interests into Pullman's affairs is indicated by the election of R. K. Mellon as a director. Pittsburgh interests, including the Mellons, were largely interested in Standard Steel Car.

Freight Terminal Planned for South Bend, Ind.

The Chicago, South Shore & South Bend Railroad has acquired an 11½-acre tract in South Bend, Ind., as a site for a new freight terminal. The property was purchased in the name of the Indiana Industrial Land Company, and is adjacent to the tracks of the New York Central Railroad.

This is a further step in the improvement program begun four years ago when the present management took over the railroad. Rapid growth of carload and less-than-carload freight business in that period is the foundation for this new expansion.

The acquisition and development of this property according to plans of the line will enable the South Shore Line to offer shippers prompter and more convenient service, will eliminate the movement of freight over South Bend streets and will open up highly desirable sites for industries.

The South Shore Line will develop the site as a freight terminal and industrial site with inbound and outbound freight tracks and houses. Detailed plans for the installation of trackage and the reconditioning and construction of buildings on the property are being drawn up.

When the new terminal is completed, the South Shore Line will abandon its present freight terminal on La Salle Street east of Sycamore Street, and will discontinue the present method of handling less-than-carload freight in tractor-trailers over South Bend streets from the old freight house now located at Orange and Olive Streets.

Recent Rolling Stock Orders and Deliveries Include Thirty Units

CANADIAN as well as United States properties figured in a number of car orders and deliveries which were announced during the closing weeks of the year. The Ottawa Car & Manufacturing Company has received an order from the Hydro-Electric Power Commission of Ontario for four motor cars and one trail car for interurban service, delivery of which is to be made early in the new year. The motor cars will be of the four-motor, double-truck, double-end, one-man type, with seats for 50 passengers. Over-all length of the cars for Canadian service is to be 51 ft. 2 in.; over-all width, 8 ft. 4 in., and total weight of bodies, trucks and equipment is expected to approximate 58,000 lb.

The trail car is of the same general dimensions, with an estimated weight of 44,500 lb. Both motor and trail cars will be of

Details of Recent Rolling Stock Orders

Name of railway	Hydro Electric Power Commission of Ontario	British Columbia Electric Ry	Youngstown Municipal Railway
City and State	Windsor, Ont.	Vancouver, B. C.	Youngstown, Oh
Number of units	4	15	13
Builder of car body	Ottawa Car Mfg. Company	Canadian Car & Foundry Company	Kuhlman Car Company.
Air brakes	Westinghouse	Westinghouse	Westinghouse; pedal.
Armature bearings	Plain	Plain	Roller.
Axles	A.E.R.E.A.	A.E.R.E.A. "E-4"	Brill special.
Car signal system	Faraday	Faraday	Bus type, with cord.
Compressors	Westinghouse DH-16	Westinghouse DH-25	General Electric
Conduit	Metal	Metal	Duratube flexible
Control	Westinghouse K-35	Westinghouse K-35	Westinghouse pedal.
Couplers	Tomlinson	Car builders	Brill.
Curtain fixtures	National Lock Washer Company	Curtain Supply Company	
Curtain material	Pantasote	Pantasote	None.
Destination signs	Hunter	Hunter	None.
Door mechanism	National Pneumatic	National Pneumatic	Hunter.
Doors	Folding	Folding	Interlocked; selective valve.
Fare boxes		Cleveland	Folding.
Finish (paint, enamel, lacquer)	Paint	Enamel	Cleveland.
Floor covering		Maple	Duco.
Gears and pinions		Tool steel	Flexolith
Glass	¼-in. plate	Plate	W-N drive.
Hand brakes	Peacock	Peacock	Plate.
Hand straps			
Heat insulating material	½ in. cork composition		Stanchions.
Heaters	General Electric	General Electric	
Headlights	Crouse Hinds	Golden Glow	Chromalun; thermostat control.
Headlining	Agasote	Agasote	Ohio Brass
Interior trim	Birch, cherry stained	Birch	Haskelite.
Journal bearings	Plain	*Plain	Haskelite and wood, walnut finish.
Journal boxes		Car builders	Plain.
Lamp fixtures	Dome	Electric Service Supplies Company	Standard.
Motors	Four Westinghouse	Four Westinghouse No. 510 A	Ivanhoe.
Painting scheme		Red; cream trim	Four Westinghouse 35 hp.
Registers	None		Brown and cream.
Roof type	Arch	Arch	Ohmer.
Roof material	Basswood, canvas covered	Steel and wood; canvas covered	Arch.
Safety car devices			Wood; canvas covered
Sash fixtures		O. M. Edwards	
Seats	Heywood-Wakefield	Car builders	O. M. Edwards.
Seat spacing	33 in.	30 in.	Brill 210C.
Seating material	Plush	Leather	29½ in.
Slack adjusters	Westinghouse	American automatic	Brown Spanish leather.
Steps	Folding	Folding	
Step treads	Universal	Irving	Stationary.
Trolley	Ohio Brass, No. 13119	Earll retrievers	Kass Safety.
Trolley base	Ohio Brass	Ohio Brass	Ohio Brass.
Trolley wheels	Ohio Brass, 5-in.	Ohio Brass 5 in.	Ohio Brass.
Trucks	Baldwin	Car builders	Ohio Brass.
Ventilators	Nichols Lintern	Nichols Lintern	Brill No. 177 E-1-X.
Wheels, type	Rolled steel, 33 in.	Rolled steel, 26 in.	Brill standard.
Wheelguards or fenders	Pilot	Wheel guards	Rolled steel 22 in.
			H-B tray type life guard.

*One car with SKF bearings.

Digitized by Google

semi-steel construction, with end doors and arch roof.

The Canadian Car & Foundry Company, of Montreal, recently delivered to the British Columbia Electric Railway fifteen one-man two-man, single-end, double-truck motor cars for city service in Vancouver, B. C. The cars, which are of the pay-as-you-pass type, with single treadle exit door at center and at rear end, are of all-steel construction, with the exception of some members, which are made of duralumin to save weight. Over-all length is 46 ft. 2 in., and total weight is about 38,000 lb. Arch roof construction is employed.

The Youngstown Municipal Railway has placed an order with the Kuhlman Car Company, Cleveland, for thirteen one-man, double-end, double-truck motor cars for city service in Youngstown, delivery of which is to be made Feb. 1. Steel, wood and aluminum are used in the body construction, and it is expected that the total weight will be held down to 28,000 lb. There will be end doors and arch roofs. Length over all is 40 ft. 6 in., with length over the body posts of 26 ft. 5 in. Bolster centers are 17 ft. 2 in., and truck wheelbase is 5 ft., 1 in. Brakes are of the Westinghouse foot pedal, variable load type, with automotive-type hand brake.

Outside finish will be of Duco, with enamel used for interior finish and trim. Vestibule windows will be of non-shatterable glass. Door mechanism is interlocked, with selective valve control. Cars will be driven by four 35-hp. Westinghouse motors, with WN drive.

The J. G. Brill Company announces that it has received an order from the Delaware Electric Power Company, Wilmington, for twelve more cars similar in type to the two previous orders of ten cars each, which were delivered late in 1928 and during the summer of 1929. The cars were described in detail in the ELECTRIC RAILWAY JOURNAL of Dec. 15, 1928.

Equipment specifications on a number of the recent purchases are set forth in the accompanying table.

Bus Manufacturers Close Year with L

FOR extension of existing facilities and for replacement purposes, orders and deliveries of a considerable number of buses have been recorded lately by electric railways and their subsidiaries.

The Brooklyn Bus Corporation, subsidiary of the Brooklyn & Queens Transit Corporation, has received ten Twin Coaches, twelve ACF metropolitan type coaches, and two Yellow 38-passenger buses, a number of which have been placed in service on the Manhattan Bridge route, pending the granting of further operating rights by the city of New York. The Los Angeles Motor Bus Company, operated jointly by the Los Angeles Railway and the Pacific Electric Railway, has received twelve Twin Coaches of the urban type, bringing its total number of vehicles of this type to 26. Other recent deliveries of Twin Coaches include ten to the Northern Texas Traction Company, of Fort Worth, five to the San Diego Electric Railway, and one to the Portland Electric Power Company, all of the urban type, seating 40 passengers. The Twin Coach Corporation has also delivered six trackless trolleys to the Utah Light & Traction Company for service in Salt Lake City, and one rail street car of 52-passenger capacity to the Brooklyn & Queens Transit Corporation for trial operation.

A notable recent installation is that of the North Coast Transportation Company, one of the Stone & Webster transportation lines operating out of Seattle, which has received four 37-passenger parlor observation coaches, mounted on ACF 264-in. wheelbase chassis and equipped with 175-hp. Hall-Scott engines. The same company has also received two 37-passenger parlor car coaches, mounted on the new ACF 240-in. wheelbase chassis and equipped with 120-hp. Hall-Scott engines. Other deliveries of ACF equipment include two 23-passenger urban coaches to Pioneer Transportation, Inc., two 33-passenger urban coaches to the Interstate Street Railway, of Attleboro, Mass., and one 40-passenger, all-steel metropolitan type coach each to the Portland Electric Power Company, the San Diego Electric Railway, and the New Orleans Public Service Company.

International Motor Truck Corporation reports the delivery of Mack buses to the following electric railway companies: four six-cylinder, 25-passenger parlor car buses to the Cincinnati Street Railway, one four-cylinder 29-passenger city type bus to the Denver Tramway Company, and one four-cylinder 177-in. chassis to the Peoples' Motor Coach Company, of Indianapolis, the last named being a subsidiary of the Indianapolis Street Railway. Orders for Mack buses are also reported from the Lehigh Valley Transit Company and the Cincinnati Street Railway, which is adding ten 29-passenger city type buses, powered with six-cylinder engines, to its fleet.

General Motors Truck Company reports delivery of one Type W city service bus to the Springfield Traction Company, Springfield, Mo.; three Type W observation buses to the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa; two Type W city service buses to the Oklahoma Railway, Oklahoma City; one Type Z 29-passenger bus to the Cumberland & Westernport Transportation Company, Cumberland, Md.; and six buses to the Georgia Power Company. Public Service Co-ordinated Transport has taken delivery of ten 38-passenger Yellow coaches, mounted with Lang bodies. The Fifth Avenue Coach Company, of New York, has placed an order with the General Motors Truck Company for 100 Type Z 225 chassis, for double deck bodies. These buses are being ordered to replace obsolete equipment, and delivery is to start early in the year.

Alliance System Being Improved

A moving picture camera is being used by C. E. Sperow, general manager of the Stark Electric Railroad, Alliance, Ohio, to record improvements being made over the division. Wherever new work is being done Mr. Sperow is on hand to record its various phases. These records are kept for future reference.

The Stark Electric is completing its 1929 rehabilitation program which includes considerable work over the 35-mile link. Two concrete spans have been replaced with steel bridges. Ten thousand new ties were installed. There was a similar number of new ties last year, while the 1930 program calls for 15,000.

New overhead wires were placed on most of the line in Alliance. About half a mile of 100-lb. rails was installed with thermit-weld joints throughout. In the business district, sections of old rail were replaced with new rails, all joints being welded.

In addition to this work, the company constructed a new track on Liberty Avenue while this street was being repaved by the city.

Converter Substations for Wilkes-Barre

The Wilkes-Barre Railway, Wilkes-Barre, Pa., recently changed its policy of generating its own electrical energy and now intends to purchase power from three local power companies. The power companies will supply power to eight new synchronous converter substations, equipments being built by the Westinghouse Electric & Manufacturing Company.

There will be six 750-kw. synchronous converter substations and two 500-kw. converter substations. Two of the 750-kw. stations and one 500-kw. station will be for automatic operation, while the others will be the manually controlled type.

All of the synchronous converters will be of the shunt wound type. They will operate in conjunction with transformers having 8 per cent reactance. This type of machine was specified by the purchaser to obtain superior voltage and power factor characteristics, and also to afford stability to the substations while operating together on a common feeder network.

Signal Equipment Being Installed on Gary Railways

Work of modernizing the signal equipment of Gary Railways, Gary, Ind., which has been in progress for more than a year, is proceeding apace. The cost of the 96 block signals alone will be approximately $65,000, and the cost of wire and labor will amount to an additional $35,000. The most recent installations have been between Valparaiso and Woodville. When the Valparaiso division is finished there will remain only the Crown Point and Hobart divisions. Signals for these sections have been ordered and work will get under way shortly after the first of the year.

Improving Winnipeg

Track improvements involving a total expenditure of over $340,000 have been made during the past year by the Winnipeg Electric Company.

The biggest item was the Main Street trackage, where double tracks were laid inside the old tracks, thus allowing more space at the sides for other vehicular traffic. This work cost $135,000. The track is 115-lb. steel laid on steel ties. The steel tie was used for the first time in Winnipeg. Elastite filler alongside the rail to absorb shock, and thermit-welded joints were two of the modern devices in track construction used.

Double track extension on Stafford, from Grosvenor to Lorette, cost $104,400, and meant laying 3,000 ft. of new double track. The extension on Corydon, from Lilac to Wilton, was 2,900 ft., and cost $81,760.

A single track extension of 2,000 ft. from Midland to Worth on Notre Dame Avenue cost $10,615.

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

Volume 74 New York, February, 1930 *Number 2*

Supreme Court Strikes Off Shackles of Inadequate Rates

GOOD reason for expecting improvement in the financial condition of the electric railway industry is found in the recent decision of the United States Supreme Court in the rate case of the United Railways & Electric Company of Baltimore. The court definitely established two important principles of rate making and reaffirmed a third which it had previously laid down. It held that the electric railway company was entitled to a return of 7½ to 8 per cent on its present fair value. It ruled that depreciation should be set up on the basis of "expenditures equal to the cost of the worn-out equipment at the time of replacement; and this, for all practical purposes, means present value." Moreover, the decision suggests, although it does not definitely state, that present reproduction cost must be considered the most important factor in determining valuation for rate-making purposes.

Encouraging, indeed, is the ruling that a return of 7½ to 8 per cent is not excessive. Since the industry in general has had to pay interest at this rate or more when it has gone into the market for new money, it cannot fairly be denied permission to earn that rate of return. Few state regulatory bodies, however, have been willing to grant rates sufficient to accomplish this purpose. It is noteworthy that only two members of the Court, Justices Brandeis and Holmes, took exception to this part of the decision and that their objections were directed rather at the rate base than at the rate itself.

Concerning the proper basis upon which to calculate depreciation, wide differences of opinion have long existed. On the one hand it is said that the purpose of setting up depreciation is to permit the replacement of worn-out physical property. The natural corollary of this is that replacement cost should be the basis of calculation. On the other hand it is claimed that the object should be merely to restore to the treasury the money originally spent; from which it follows that original cost rather than replacement cost should be the basis of calculation. When the latter plan is adopted the extra cost of the new property required to replace that which has been worn out must be met by borrowing additional money and thereby increasing the capital investment.

Provided that the earnings are high enough to permit borrowing, it does not make a great deal of practical difference which method is followed. In one instance the company must earn a larger sum for depreciation, while in the other, the depreciation allowance is smaller, but there is also required a certain sum for interest on the additional investment. The relation between these amounts depends on the difference between the original and the replacement cost and the length of the useful life of the property. Since the general level of prices is upward rather than downward, the original cost method of calculating depreciation will result in a steadily increasing invesment and a steadily increasing burden of interest charges.

To what extent the opinion of the court may be taken as an indorsement of the reproduction cost theory of valuation is not entirely clear. This point was not at issue and the decision merely asserts that "it is the settled rule of this court that the rate base is present value." Judging from the previous rulings of the court in the Indianapolis Water Company case and the St. Louis & O'Fallon Railroad case it may be inferred that reproduction cost is to be considered a major element in determining value. This view is strengthened by the vigorous dissent of Justices Brandeis and Holmes, who are recognized believers in the prudent investment theory of valuation. The language of the decision, however, leaves this phase of the matter open to argument.

Prompt improvement of the financial condition of the railway in Baltimore may be expected to result from the decision. Ultimately it is likely to have far-reaching effects in fare cases now pending in other cities. At this time when the need for modernization of the electric railway equipment has received wide recognition, the decision of the court is particularly timely and opens the door to a new and better era for the local transportation industry.

Improved Fire Record Brings Lower Insurance Rate

FOR many years the fire record of the electric railways was not one in which the industry could take much pride. More recently, however, a marked improvement has occurred. Several factors have contributed to this improvement. Present-day structures and equipment are not so inflammable as those of an earlier period. Greater care is devoted to storage of materials. A larger measure of attention is paid to periodic inspections. More efficient methods of fire detection have been developed, as well as automatic equipment for fire extinguishing. All this has resulted in a material decrease in the number of fires in electric railway carhouses and shops, and a decrease in the seriousness of the fires that have occurred.

This achievement has been the more noteworthy when compared with the steadily rising fire losses for the country as a whole. In recognition of this, new fire insurance rate schedules for electric railways have been granted in 42 states, and tentatively adopted in three others. For this accomplishment a large measure of credit goes to the committee on insurance of the American Electric Railway Association. It is now up to the

Digitized by Google

railways themselves to take advantage of the opportunities that have been offered to them. If they do, substantial savings will be effected. There is every reason to expect that improvement in the fire record will be continued, in which event it may be anticipated that still further reductions will be made in the rate schedule.

Luxury Becomes a Necessity

DE LUXE buses in urban service have proved their ability to earn profits. That they have done so independently and not at the sacrifice of revenue from city-type operations is a fact of major significance. The attractive equipment and the fast, direct service which is typical of the majority of these lines has appealed to a new kind of rider. This is clearly shown by a survey of numerous properties published elsewhere in this issue. Almost without exception, the de luxe lines now in operation, charging fares considerably above those for street car service, are routed so as to connect the downtown business, shopping and theater districts of the city with one or more exclusive residential sections. The business man has found this service convenient for his trips to and from the office and as comfortable as traveling in his own private automobile. During the mid-day hours the women enjoy an attractive vehicle for their shopping trips.

Some of these lines have opened new territory that would not support or permit street cars, but the majority of them are furnishing a selective additional service through communities already well served by city lines. The higher fares, 25 cents in the majority of instances, make it possible for the operating company to render faster and more luxurious service, yet at the same time offer economies to the motorist who has been in the habit of using his automobile for commuting. It has been estimated that a person cannot drive his car into town, park it and return home at a cost less than $1 per day. At half the cost he can use the buses and not have the worry of driving or parking. Traffic conditions, parking restrictions and the cost of short-time storage in a garage are all working for the benefit of the de luxe bus and are more than indirectly responsible for the expansion of this class of service.

Further evidence of the future of the de luxe bus is found in the statistics of recent bus purchases. There were more buses of this type bought by the electric railways last year than in any previous year. Approximately 400 more de luxe buses were purchased in 1929 than in 1928, while there was an increase of only 23 in city-type buses. Undoubtedly there is a definite luxury trend in bus operations, and the electric railways are strengthening their systems both from an operating and economic standpoint by expanding their service along this line.

Value of Elevated Railways Proved Anew

ALTHOUGH occasional clamor is heard in favor of the removal of elevated railways from city streets, evidence continues to accumulate that they still have a real place in providing transportation in large communities. An apt illustration of this is furnished by comparison of the service now being given by the elevated railway lines in New York City and the service which a new elevated motor highway now under construction along the Hudson River waterfront is expected to render. The cost of this undertaking probably will exceed $18,000,000, and its carrying capacity has been estimated at approximately 100,000 persons per day. A few blocks away an elevated railway is at present carrying more than 250,000 persons per day. A subway could do no more. Yet the city, while spending vast sums for the construction of the new elevated highway, is proposing at the same time to tear down its elevated railways.

An argument often advanced is that the present elevated railway structures are unsightly. In this respect the elevated highway promises little improvement. Already a forest of ugly steel columns has sprung up in the center of West Street interfering to a considerable extent with surface traffic. Of course, there is much to be said in favor of the new project. By providing a by-pass route without grade crossings between lower Manhattan and the uptown residential districts it will undoubtedly afford some relief to the city's congested streets. But the real measure of usefulness of a transportation facility is the number of people accommodated. From this standpoint the elevated railways are far more valuable than the new highway.

In Manhattan, unfortunately, the elevated railways stand low in public esteem. Stations of corrugated iron designed and built in an era when jigsaw work was the ultimate in ornamentation cannot fail to shock the esthetic tastes of the present-day Gothamite. Nor can rolling stock of the pre-Spanish war period hold forth much in the way of rider appeal. But stations can be made artistic, and modern cars, less noisy and more comfortable than those now in use on the "L" in Manhattan, are obtainable.

That the prejudice against elevated structures in New York is being carried to an extreme is evidenced by the fact that this very useful and relatively inexpensive form of transit is being to a large extent ignored in plans for the future. Into the far reaches of Brooklyn and Queens, amid scenes almost pastoral, subway routes are being planned at enormous expense to handle anticipated development that is at best many years away. Chicago, more wisely, provides in her new city plan for some 70 miles of elevated lines to serve the more remote suburbs. Before deciding that the day of the elevated railway has passed, New York would do well to study carefully the facts and figures of the situation.

Scientific Accident Analysis Brings Practical Results

SAFETY has as its ultimate goal the prevention of all accidents. In industry, however, it has been necessary to interpret it in relative terms because the ideal seems impossible of attainment. Since it is inevitable that some accidents should occur, their cost must be estimated year by year and allowed for in the budget as a more or less constant element of operating expense.

As a result of this treatment of the situation from the financial point of view, accident prevention work frequently degenerates into a part of the regular routine, and efforts to better conditions become perfunctory. Preaching accident prevention by emphasizing to the men the cost to the company is not effective, particularly if the operator believes he is doing the best he can. Trying to place the blame for the accident on someone other than the operator is not profitable, for it does not

Digitized by Google

reduce the pain of the victim or the grief of his friends, nor does it save the expense involved. But that sometimes represents the scope of accident prevention work. In refreshing contrast to this is the attitude of the winners of the latest Anthony N. Brady Memorial Safety Award, as evidenced by the briefs submitted in the competition and abstracted in this issue.

The program of research in accident prevention outlined by the Boston Elevated Railway, which won the Brady medal in the class of large properties, is particularly noteworthy. Not satisfied with the ordinary methods, the management had a searching analysis made to determine, so far as possible, all the causes of accidents in order that they might be dealt with intelligently and eliminated wherever possible. A program was put before the organization in such a manner that all co-operated in working it out effectively. After only one year the results have been remarkable. They have proved the soundness of the methods used. The good operators have remained good and the poor ones have become much better. There has been a marked reduction in the number and in the severity of accidents.

While the methods which are so successful in Boston may appear elaborate for some of the smaller properties, there is nothing that cannot be used with suitable modification. In fact, the smaller size of a property should make the use of similar methods simpler and should produce results more quickly. The other winners of the Brady awards did use methods which, while not developed so scientifically as those used in Boston, followed along similar lines in many respects. Intensive and continuous efforts made it possible to improve the already good records they had achieved in past years.

Putting Noise on the Defensive

NOISE is receiving ever-increasing attention as an unfavorable factor in American life, particularly in metropolitan centers. Means of eliminating or reducing it are under consideration nearly everywhere. Unnecessary blowing of factory whistles has been banned. Even the ringing of church bells is looked upon with disfavor in some cities. The noisy motor truck, a consistent offender, has occasioned so much caustic comment that in many places it has become the subject of police regulation. Drilling and blasting for building foundations are today subjects of criticism. Riveting, that symbol of progress, is under suspicion, for now electricity welds building frames in silence. Contractors have become apologetic about the noise they feel compelled to make.

With all this campaign against unnecessary noise it is inevitable that unfavorable attention should be directed to noisy street cars. Many people probably believe that the noise of street car operation cannot be eliminated. Few indeed realize the progress that is being made along this line. The committee on noise reduction of the A.E.R.E.A. has shown conclusively that most of the noise usually associated with car operation is unnecessary. New cars are being built that are far less noisy than those of the older types. Even the old cars can be made far less noisy than some of them now are. A monkey wrench and a screwdriver will work wonders in tightening up the loose bolts and screws. Loose or broken parts that rattle and squeak can be attached securely or replaced. Noisy air compressors, the curse of many cars, can be repaired or new ones installed that do not make a racket every time the car stops.

As to the track, of itself it is one of the quietest things on earth. But when a car passes it begins to act up and emit many and various noises. Here again the wrench and the welder can make a lot of difference. By tightening loose joints, truing up worn surfaces and securing correct alignment even poor track can be so improved that cars can run on it without emitting sounds of pain that arouse the neighborhood.

Since noise is an indication of inefficiency, it follows that the noisy car is being subjected to strains that are heading it for the repair shop sooner than necessary. Money spent on noise reduction will return directly in lower maintenance costs. Equally important, however, is the effect on the public. This cannot be measured in dollars and cents but it is hardly an exaggeration to say that it may mean the difference between success and failure.

Use of One-Man Car Upheld

FINDINGS of the special master in the suit in equity of the Shreveport Railways vs. City of Shreveport to enjoin enforcement of an ordinance requiring two men on every street car are not only of importance to the company in question, but also carry a message affecting the entire industry. In no uncertain language it is pointed out that a municipality's right under its police powers to interfere in matters of this kind exists only when necessary to the safety and convenience of the public. The court states that from the evidence the modern one-man car with safety devices has been shown to be safer than its predecessor, the two-man car. Furthermore, the evidence shows that speed has been increased and that companies have been able to operate more service, that wages have been increased, and that operators have become more efficient and better satisfied when the change from two-man to one-man cars has been made. Moreover, the court found that since 1917 no public service commission has refused to permit the operation of one-man cars, and since 1924 no commission has limited the right to use one-man cars subject to any particular conditions. Under these circumstances the refusal of the city to permit the use of one-man cars of the latest type was held to be arbitrary, and equivalent to a taking of the railway's property without due process of law.

Aside from the specific matter of safety of one-man operation, the court made several significant statements. The evidence showed that a choice had to be made between reducing railway operating expenses through the instrumentality of the one-man car, and the ultimate bankruptcy of the company and the loss of electric railway service to the city of Shreveport. The court was unwilling that the city should lose its railway. It appraised the situation correctly when it said that street cars, for the present at least, appear to be an essential means of transportation for a large portion of the population, particularly those not able to own automobiles, and the loss of such service without an equally cheap substitute would be a serious handicap to a growing community.

While the fight against the one-man car has largely died out, this decision makes the position of the courts more definite than it ever has been. In addition, it challenges the right of the municipal authorities to exert their police power in matters which do not affect the safety and convenience of the public.

Digitized by Google

NOTABLE ACHIEVEMENTS IN

Accident Prevention

Win Brady Awards for Boston, Tampa and Tide Water Companies

Marked improvement shown in 1928 safety records as compared with previous years. Honorable mention made of Louisville Railway and El Paso Electric Company

WINNERS of the Brady safety medals have recently been announced by the American Electric Railway Association. There are three divisions in the contest, according to the amount of service rendered. In Class A, including electric railway organizations operating more than 5,000,000 vehicle miles, the award, consisting of a gold medal, was made to the Boston Elevated Railway, with honorable mention to the Louisville Railway. The Class B award, a silver medal, for those companies operating more than 1,000,000 but not over 5,000,000 vehicle miles, went to the Tampa Electric Company, with honorable mention to the El Paso Electric Company. In Class C, for smaller properties, the bronze medal was awarded to the Tide Water Power Company of Wilmington, N. C.

The awards are a memorial to the late Anthony N. Brady, and are presented each year for the best records of safety in operation and health promotion made by electric railways. The selection of the winners was made by a joint committee of the American Museum of Safety and the American Electric Railway Association, consisting of Lewis Gawtry, president the Bank for Savings, chairman; Col. A. B. Barber, manager transportation and communication department U. S. Chamber of Commerce; James H. McGraw, chairman of the board McGraw-Hill Publishing Company, Inc., and Charles Gordon, managing director American Electric Railway Association.

Accident Analysis Successful in Boston

BY FAR the most impressive accomplishment of the Boston Elevated Railway in its safety work has been its study of the human factor in accidents. Since it was recognized that accidents may be caused by some human failings, primarily of a psychological nature, the railway engaged the Personnel Research Federation of New York to survey the situation. As a result it was found that half of the accidents happen to less than a third of the operators. In one sample of 200 men of ample experience and maturity, one-half the accidents happened to only one-fifth of the motormen. This difference in proneness to accidents holds even when the question of blame is eliminated. A further study indicated that men who pay the most attention to operating efficiently, as evidenced by the percentage of coasting obtained, are also the men who have the least accidents. It was found that the 100 men with the lowest coasting records had 364 accidents and 73 delinquencies, while the 100 men with the high coasting record had 313 accidents and 46 delinquencies. A further study of delinquencies of bus operators developed that, apart from fare irregularities, among the low-accident men there was an average of 9.7 delinquencies which were made by 65 per cent of the men; whereas among the high-accident men, there were 16.8 average delinquencies made by 89 per cent of the men.

A study of the men over 50 years of age showed that 21 men with abnormal blood pressure had a total of 136 accidents, or 6½ per man; those with normal blood pressure, numbering 38, had 110 total accidents, or an average of 3 per man. The length of service was found to have a very distinct relation to the number of accidents, the older men having far less accidents than the younger ones; second, the largest number of accidents and the largest proportion of men having a large number of accidents are in the group with less than one year of experience.

Summing up, it was found that there are four classes of men who may be regarded as more than ordinarily prone to accidents: (1) those who do not operate economically, as shown by low coasting record; (2) those whose record of delinquencies is long; (3) older men with abnormal blood pressure, and (4) younger men with very limited experience.

Following this survey the records of car operators and motormen were studied individually. They were divided into two classes: (1) high-accident men, i.e., those with five or more collisions during 1927; (2) low-accident men, i.e., those with fewer than five collisions during 1927. It was found that out of 2,300 operators, approximately 20 per cent, or 472, were high-

Digitized by Google

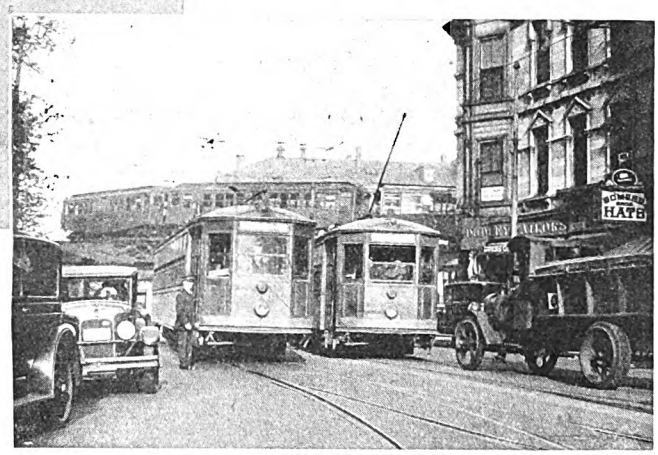
In Boston, traffic lanes are marked prominently at congested intersections

accident men, and the remaining 1,828 were low. The 1,828 low men were regarded for the time being as satisfactory operators, and were left under the usual influences inducing safety.

The high-accident men were then studied and handled individually. Two things were noted about these men: (1) the man who tends to have many slight accidents, which are themselves relatively unimportant, is also the man who tends eventually to have serious accidents; (2) the man who has many accidents in one year is also the man who is likely to have accidents every year. Accident proneness may, therefore, be regarded as something in the nature of a disease, which has to be diagnosed and treated. The first step in treating a man is finding out why he has accidents.

Instructors were then brought into conference, relative to the 472 operators who were on the high-accident list. They rode on the cars with these operators, making observations as to their habits. Then the habits of the operator, his record, personality, and physical condition were all considered together in an attempt to arrive at conclusions regarding the cause of his accidents, and in relation to the possibility of the effectiveness of individual action, the main thought being that the man should be cured of his accident tendencies if possible.

The method chiefly depended on to produce a reduction in accidents was instruction on the job by the especially trained instructors. While instruction was mainly relied on, two other methods were used: (1) where the accident record of a man indicated that he did not realize his responsibility, he was interviewed by the safety supervisor and division superintendent; (2) where the cause of accident was ill health, the men were physically examined and told what was the matter with them, and advised to go to their own physicians for treatment.

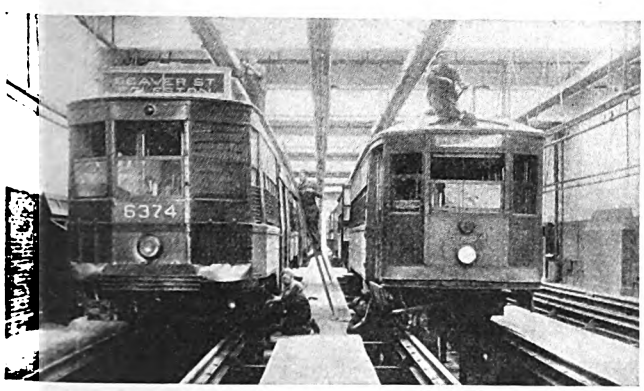


Some 291,000 cars or trains passed over this electric switch in 1928 without a derailment

Since the habits in question were generally of long standing and a change would require some time, it was necessary to arrange follow-up work. Each inspector was required to see each of his operators on the job, the frequency depending on the seriousness of the case. When it became apparent that although a man might do his job well during the hours the instructor was with him, he might not do it at all well during the other 47 hours of the week, the entire street supervisory force was enlisted. Their hours and duties were rearranged so that they could include a great measure of personal supervision of high-accident operators.

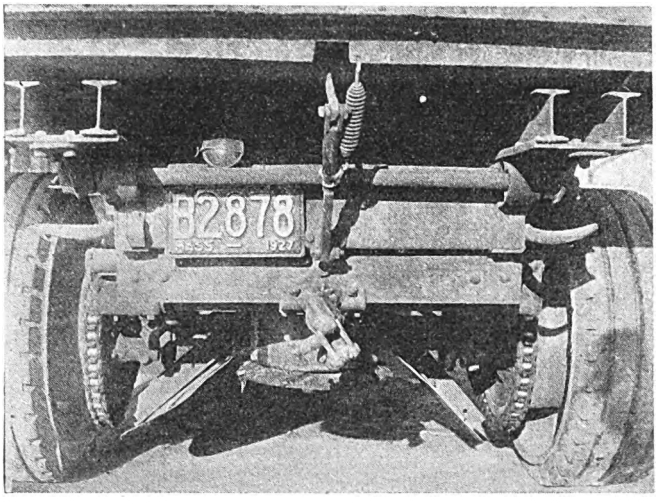
A selected group of instructors and supervisors was consolidated into a group of safety inspectors, working directly under the safety supervisor. Districts were allotted to these inspectors, according to the routes and districts where the accident hazards were greatest. Sample studies of accidents and times of accidents were made. It was then made the duty of the inspectors to acquaint the high-accident men with all the information they had regarding the accident hazards of the district.

Other activities of the transportation department con-



Many safety measures are in use in the Boston shops. This view shows the advantage of depressed pits with leg holes for inspection and repair work on trucks and motors

Digitized by Google



Sand is spread on slippery streets where buses of the Boston Elevated run, and it protects general vehicle traffic as well

cerning accidents have included conferences with the division superintendent regarding the method of handling men, co-operation of the dispatchers and carhouse starters, particularly with respect to warning operators when weather conditions were unfavorable, or when men were placed on new routes, and keeping a careful check of punctuality. These men have also been encouraged to inspect cars and see that the equipment is on hand and the car in perfect running order.

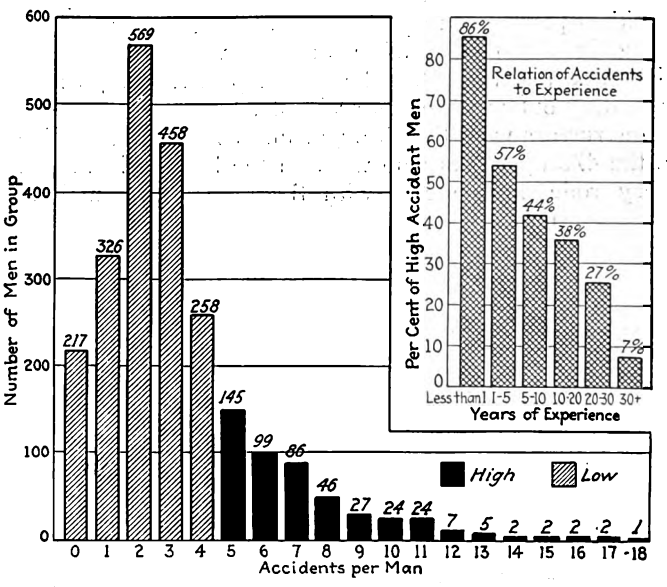
Results that have been obtained have proved the soundness of these methods. During the year 1928 the collision accidents involving surface cars were reduced from 7,197 to 5,923. This reduction came about by concentration of efforts of high-accident men. Figures show that the 472 high-accident men in 1927 averaged 7.1 accidents per man, or a total of 3,327 accidents. During 1928, 312 of these men averaged 2.1 accidents per man, or a total of 663; 160 averaged 7.1 accidents per man, or 1,136 total accidents. The accidents for this group were therefore 1,799 altogether. Contrasted with this the 1,828 low-accident men in 1927 averaged 2.1 accidents per man, a total of 3,870 accidents. During 1928, 1,693 of these men averaged two accidents per man, or 3,386 accidents; while the remaining 135 averaged 5.8 accidents per man, or 738 accidents, making a total of 4,124 accidents for this group. Thus it will be seen that while there was a 46 per cent reduction in the accidents of the men in the first group, a number of the men of the second group had a larger number of accidents in 1928 than 1927. The discovery, after the first year's investigation, that a few of the men placed in the low-accident group could not be classed as constantly low-accident men was an unforeseen but valuable result of the investigation. With the additional knowledge obtained, the system of training has been rounded out to include provisions for special treatment of this new group.

Accident location studies have been made on a different basis from that usually employed. For instance, on a particular route a check-up showed that the inbound collisions were all with the front left corner of the car, while outbound collisions were with the right front corner. The reasons for this were investigated, and the instructors and men were told how they should operate in view of the condition. This cut the accidents on the line to one-third of the former number. In another instance, instructors were overheard telling the men how much extra care was necessary at a certain corner, where studies showed that there had been no accidents for more than a year.

Investigation showed that the times of the accidents as well as the locations should be taken into account. In one place it was found that inspectors had been on duty sixteen hours a day during the previous winter to look after traffic conditions, but during the evening rush the inspector was required to go to a cross-over 1,000 ft. away. Study revealed that 80 per cent of the accidents at this point occurred during the evening rush hour. Placing a man there from four to six in the afternoon resulted in cleaning up the bad spot, and the sixteen hours of unnecessary supervision was eliminated. In another place, the prevailing type of accident in the summer required twenty-hour supervision, while a study of winter conditions showed that 75 per cent of the accidents occurred during only five hours of the day. The superintendent found that he could arrange for five hours supervision, and did so, reducing accidents on the route from nineteen to nine a month.

At the beginning of 1928, the inspection school and the employment office of the railway were consolidated as the division of employment and training. Inspectors teach the new employees as well as the older ones. Preparing for an interview with a man, the superintendent decides that it would be better to have this man's instruction followed up on the card. The regular instructor arrives with him and gives him instruction when necessary. Eighty high-accident men have been taken out on special cars in street operation by the division inspectors. These men have been re-instructed for from one to three days, and special attention has been given to any faults in operation or habits which increase accident hazards.

The work of 1928 showed that when every possible expedient had been tried to cure men of their accident proneness, some were not successfully handled. In order to discover the reasons for their accident proneness a psychology laboratory was set up and these men put



Accident proneness is confined to relatively few men. This record from Boston shows that 1,828 low-accident men had 3,870 collisions, or an average of 2.1 per man, while 472 high-accident men had 3,327 collisions, or 7 per man. The small chart shows distinctly that caution comes with experience. most of the high-accident men being young in the service

Digitized by Google

through tests to secure further information about their mental make-up. After observations it was found that several psychological factors are more or less constant as contributing causes of accidents: (1) the degree of adaptability of the operator to various types of equipment; (2) his quickness of reaction to sound and light; (3) powers of concentration over a period; (4) judgment of speed and distance.

From these tests it was determined that operators should be divided into three classes: (1) first-rate operators, 73.6 per cent of all, who never have more than a few accidents; (2) those who for one reason or another do not ordinarily operate in a safe manner, unless special methods of instruction are adopted, but who always would be classed as high, comprising 20.5 per cent of the total; (3) those who are likely to be either in the high-accident or low-accident class in any year, forming 6.6 per cent of the men. In this third class fall those who are qualified in all classes of service and who change from one type to another, and those whose health, family circumstances, etc., either improve or become worse in any year.

The function of the safety organization, then, has been three-fold: (1) to reduce the number of high-accident men; (2) to follow up the men whose manner of operation has improved and crystallize their improved habits; (3) to prevent unnecessary shifts of those men who, due to change of operation, will have a tendency to come into the high-accident class.

Safety an Integral Part of Management

Two fundamental principles determined the policy of the Boston Elevated Railway in its safety work during 1928, according to the company's presentation. First, safety is an integral part of management and not simply something to be taken care of by a special department charged with the administration of safety features only. Second, all specific safety efforts must be preceded by and based upon thorough research and investigation into past accidents and their causes.

In order to interest the public in accident prevention, there has been close co-operation with the Massachusetts Safety Council, officials of the railway being on the executive board of that organization. During 1928 the general manager of the railway was president of the council.

Particular attention has been taken to interest the children in safety. A special motorcycle officer detailed to make observations at the opening and closing of schools found that the children from certain streets did not have due respect for their own safety, so that he visited the schools in question, talked with the teachers, and in some cases talked directly with the children of the class. Another result was the formation of a junior safety council in the schools; the co-operation of local service clubs was secured; the Kiwanis Club donated white safety belts to the boys for use while on duty as safety patrols.

In connection with its physical plant, the company has done much to make the track safe for operation. In addition a derailment committee visits the scene of the trouble whenever a derailment or a split switch occurs. The evidence obtained is weighed and a decision is reached as to the probable cause. As a result, in comparison with 243 derailments in 1927, costing in claims $15,130, there were only 208 derailments in 1928, costing in claims $11,548.

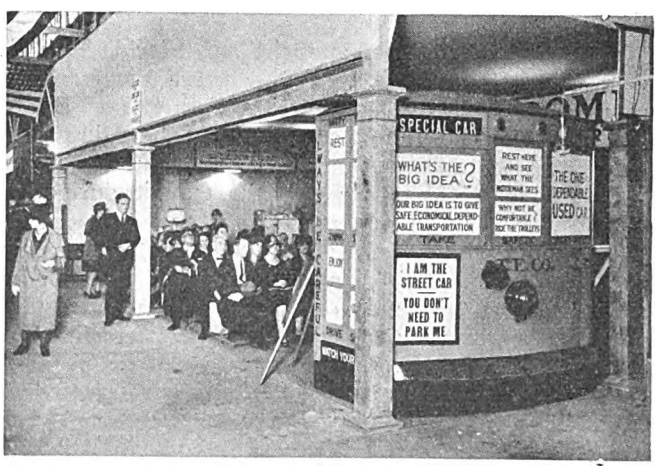
In order to prevent collisions with cars turning, clearance lines have been painted on the pavement. On one of the recently opened highways, known as the Northern Artery, the hazards to passengers have been eliminated by moving the safety zones from the highway and placing center loading areas between the tracks. These center loading areas allow passengers to keep away from the vehicular traffic, which is not halted while passengers are boarding and alighting.

Particular attention has been paid to the equipment to keep it at all times in safe operating condition. The older buses which were purchased by the company in 1922 and in several years thereafter have been replaced by modern buses of steel construction which have much greater strength to withstand shocks in collisions. The street cars have also been maintained better, and there is an improved reliability of the cars from the accident standpoint. In cars, both for surface and rapid transit lines, safety features have been installed. Much new testing equipment has been installed in the shops to insure that the cars are in safe operating condition. Changes have been made in the rapid transit stations to enhance the safety of passengers. Safeguards have been placed at approaches to drawbridges to prevent cars from running off the track at such points.

Due to the extensive use of automobiles in winter, as well as during the open months, changes in the snow removal program have been made so that a width of at least 14 ft. in the roadway adjoining the tracks is cleared, as well as the area over the tracks themselves. Using these measures, the street surface is free from snow in practically the entire width, for the whole winter. The railway also keeps open 140 miles of highway, over which its buses operate.

Tampa Betters Safety Record

SAFETY work in Tampa, which brought the Tampa Electric Company the Brady Award for 1927, had even better results in 1928. In the latter year there was a total of 820 car and bus accidents, as compared with 1,175 occurring in 1927, 2,843 in 1926 and 3,070 in 1925. This represents an improvement in 1928 over 1927 of 30 per cent, over 1926 of 71 per cent, and over 1925 of 73 per cent. From the comparative record of acci-



At the South Florida Fair the Tampa Electric Company had an exhibit which included a moving picture booth at which safety pictures were shown

Digitized by Google

dents, it appears that of the years 1914 to 1928 inclusive, the smallest number of accidents occurred in 1928. Also, during 1928 a far greater number of miles was operated per accident than was operated at any time during this fifteen-year period. The figures indicate an improvement in miles operated per accident during 1928 over 1927 of 35 per cent, over 1926 of 184 per cent, and over 1925 of 264 per cent.

The reduction in collisions with vehicles is particularly notable. In 1925 there were 2,597 such collisions, in 1926 there were 2,458 collisions, in 1927 1,021 collisions, and in 1928 only 691. These figures indicate an improvement for 1928 over 1925 of 280 per cent in miles operated per collision with a motor vehicle. The automobile registration in the two years was approximately the same. The latter year also shows a substantial reduction in other classes of accidents as compared with the three previous years.

The total expense of settlement of suits, judgments and claims was $9,940 in 1928, as compared with $35,135 in 1927, and approximately the same amount in each of the two preceding years. The total accident costs have been reduced from $56,290 in 1925, $62,182 in 1926 and $57,237 in 1927, to $25,236 in 1928. This is a reduction of approximately 60 per cent. The cost of accidents per vehicle-mile for the four years was 1.45 cents in 1926, 1,31 cents in 1926, 1.49 cents in 1927 and 0.65 cents in 1928. With an accident reserve accumulation of $60,000 at the end of 1928, it has been possible to reduce the accrual basis from 5 per cent to 3 per cent of the revenue from transportation. This record of reduction in accident costs has been obtained with a reduction in the cost of safety work from $5,448 in 1927 to $4,799 in 1928.

Safety work has been carried on by the Tampa Electric Company for many years. In a summary of the presentation for the Brady Award last year made in Electric Railway Journal for Jan. 26, 1929, page 161, were listed the several plans used up to the end of 1927. The program has been continued during the past year.

During 1928 blinker stop signs were installed at street intersections of the most important through thoroughfares. Clearance lines at curves are now painted on the street surface in yellow instead of white, which was the same color as that used by the city in marking street intersections, parking places, etc. It is believed that this change prevents confusion with other lines painted on the pavements.

In connection with the annual South Florida Fair, the company, in its exhibit in 1928, showed the front end of a street car. Inside it motion pictures and lantern slides were displayed on a screen. Two short films were run, along with slogans. It is estimated that between 18,000 and 20,000 people saw the exhibit during the ten-day period of the exposition.

Beginning with 1928, a new contest among the trainmen was begun. This plan has as its reward a monthly prize of $5 to each man of the car or bus line which operates the greatest number of miles per accident. The extra men are also divided into groups, and the members of the winning group are likewise given a prize of $5 each. This contest has proved very successful, and tends to keep interest aroused where it has perhaps lagged a little during the four-month bonus contests which were described in the article last year. Under the rules of the contest, all accidents are counted, whether chargeable or non-chargeable. In the case of unreported accidents, a regular man is disqualified from participating in any earnings of the line for that monthly period in which the unreported accident occurred.

Whenever a line makes a poor showing in the line contest for two months in succession, class meetings are held for the men from that line, in which every phase of the operation is discussed, together with the possible accident hazards, in order to ascertain if possible the reason for the line's poor showing. These classes have been found very beneficial and have always resulted in improvement for the lines that have been making a poor showing.

In the work of the shops, one of the most noteworthy accomplishments for safety during 1928 was the adoption of the system of keeping all cars and buses on the same run daily. It is believed that when a man is entirely familiar with his car by the daily use of it, he naturally will handle it with a greater degree of safetly. This system has also helped in reducing car defects, and improving the reliability of the service.

Tide Water Power Company Extends Safety Measures

DESPITE continually increasing congestion on streets and highways the Tide Water Power Company of Wilmington, N.C., maintained the excellent record during 1928 that it had established in winning the Brady Award in its class in the two preceding years. This company always has laid great stress on resuscitation of persons suffering from electric shock or suffocation in drowning. It was a pioneer in adopting the Schaeffer prone pressure method and has extended its service to neighboring industries and the general public. The company owns and operates a large bathing pavilion at Wrightsville Beach and maintains lifeguards for the protection of the public. It also has shown during the bathing season a one-reel picture, "Artificial Respiration," every eighth evening. Reports have come back from many southern states illustrating the peculiar effectiveness of this method of visual instruction.

The company also co-operates with the safety departments of the railroads and industries located in the city as well as with the local Y.M.C.A. In the company's employee school for vocational training and safe practices, the employees of other companies are welcome to receive instruction without charge.

Particular attention is directed toward all locations where accidents are likely to occur. Where the view of the track is obstructed special precautions are taken. Where a hedge is permitted to obscure the view at a crossing a continuous agitation for its trimming or removal will begin, and will be continued until the risk is eliminated or abated. Signs are placed at important points along the lines of the company giving full directions as to speed and control of the cars. It is believed that this has enabled employees to make better than average time with little if any extra hazard.

The company bettered its record of accidents from 46 in 1927 to 45 in 1928. There have been no fatalities on the properties for four years. Expressed in proportion to gross revenue the cost of accidents was 1.366 per cent for the year 1928. The claim department operations

Digitized by Google

and miscellaneous expense were 0.537 per cent of the 1928 gross earnings.

In 1928 the bonus system for rewarding trainmen and bus drivers for safe operation met with great success. Of the 34 regular operators 15, or 44 per cent, held perfect safety records. Of the average number of 48 total operators, 43 received some reward for safe operation. The plan provides for the payment of $1 to each operator for each no-accident month. In the event that he has an accident he loses all of the accumulated bonus for the year to date, but can start over the next month. There is an additional bonus of $1 for each no-accident quarter, and $5 extra for a perfect year, making a possible total actual bonus of $21. The cost of this system was $522 in 1928, or less than 1 per cent of the payroll.

Louisville Men Have New Attitude on Safety

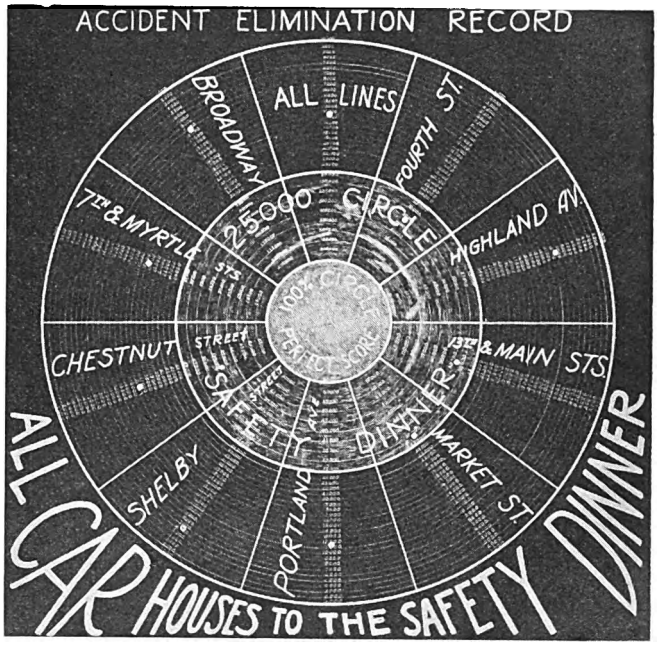
WHILE safety work on the Louisville Railway during 1928 followed along the same lines as in the past two years, there has been a change in the attitude of the men since the safety program was inaugurated in 1921. At present they are making efforts to operate safely because they have a conviction that safe operation for its own sake is distinctly worth while.

Among mechanical improvements which contribute to safety, the most important during 1928 was the elimination of a grade crossing over which three of the heaviest street car lines operate. Safety of operation has been increased by a change in the color with which the street cars are painted, the present scheme comprising a lemon yellow for the car body with a broad stripe of apple green running around the body and a cross of apple green on the front and rear dashes. Four safety zones have been installed at the principal loading points on Jefferson Street. Air gongs have been substituted on cars operating on important lines for single-tap foot-operated gongs. Treadle doors at the rear of cars on one of the one-man car lines have been installed. Improved destination signs have made it easier for passengers to distinguish routes and have minimized the hazard due to their standing in the street to see if the car approaching is the desired one. Improved springs and locking devices have been installed in electrically operated switches to prevent splitting of switches and subsequent derailment.

Despite an increase in the number of car-miles run from 12,140,867 in 1927 to 12,365,167 car-miles in 1928, the cost of repairs due to accidents was reduced from $7,262, to $6,045.

Comparison of 1928 statistics with those for 1927 shows that the latter year in nearly all respects was the safer. The total charges to the injuries and damages account were reduced from $201,112 to $162,186. The average number of miles operated per chargeable accident went up from 13,326 in 1927 to 17,440 in 1928. In this connection it must be remembered that 1928 was the eighth year of intensive safety effort on the property and comparatively little improvement was looked for.

Indicative of the change of attitude of the employees toward safety is the fact that, of 24 safety rallies held at different carhouses during the year, 22 were arranged by the platform men themselves. Posters and charts



In Louisville a dinner is given each month to the carhouses where 25,000 miles or more are run without an accident. The progress of each carhouse is shown by pins on charts posted on bulletin boards

in the carhouses are found of the utmost value in keeping the enthusiasm for safety of its employees constantly stimulated. One of these shows the average miles operated per accident from 1910 to date. Another is a blueprint which shows the complete safety record of all of the employees. Still another chart is a blueprint showing the standing of each carhouse in the company's monthly accident contest.

During the year a postgraduate course for trainmen was inagurated. This supplements the training of new employees and makes the old employee who takes it a more efficient street railway man. There also has been increased attendance by employees of the company at the Louisville Safety Council's industrial school.

The good will of the company has been enhanced by speeding up the street car service. This was accomplished late in 1927 and early in 1928. In 1927 the company operated 12,140,867 car-miles in 1,433,271 car-hours; in 1928 it operated 12,365,167 car-miles in 1,416,690 car-hours. This was accomplished with the increase in car-miles per accident and decrease in total cost mentioned elsewhere. Besides this general improvement in speed, an express service was inaugurated on one of the company's main lines during the year. For four miles in the center of the main route the street cars make no stops at streets other than transfer points, local service being given by buses.

El Paso System Increases Zero Accident Days

DURING the year 1928 the El Paso Electric Company bettered its record for any previous year, having a total of 435 accidents as compared with 445 in 1927, and 452 in 1926. This compares with 1,767 in 1921, the earliest year for which statistics were presented. Accidents were at the rate of 1.42 per 10,000

Digitized by Google

car-miles, and 2.35 per 100,000 passengers carried. The figures for 1928 represent an improvement of approximately 8 per cent in the factor of safety over the medal winning year, 1926. Reviewing results for the past eight years, the company's presentation states that accidents per 100,000 passengers carried and per 10,000 car-miles operated have been reduced more than 75 per cent.

During 1928 earnings were increased to the extent of $12,752, and expense was reduced by $18,614, through accurately fitting service to conditions. The company operated 233,452 car-miles less and hauled 76,516 passengers more in 1928 than during the previous year. Faster schedules offset lengthened headways and readjustments were followed by a further reduction of the number of street car and bus accidents.

For years it has been the practice of this company to set an accident bogey. By the beginning of 1928 so much progress had been made towards the goal of accidentless transportation that no bogey was set and the men were simply urged to do their best to "beat last year's accident record." This they did, lowering the record for 1927 by ten accidents.

That the efforts towards the reduction of accidents have been appreciated in the city of El Paso is evidenced by the many expressions of good will included in the report. The results did not follow a spurt or any series of spasmodic efforts during which spectacular improvements were shown. On the contrary, progress along safety lines was shown by regularly bettering the established accident record year after year, notwithstanding that these records have already been recognized as among the best.

Warning signs, the exercise of tact and courtesy, and extra precautions taken to prevent accidents have played an important part in the program. Careful inspections have been made, special instructors have taught student operators and a joint committee on investigating accidents has been active. Operators are continually on the alert and report all unsafe conditions. Various safety devices have been adopted, quite a few of which were developed by the men in the ranks.

Outstanding benefits have been secured through the company's honor roll and gold star merit system. A day off with pay once each month is the privilege of operators on the honor roll, and this has led to greatly increased efficiency and improved safety. The safety banquets which are held periodically have increased the interest of the men in accident prevention work, and the numerous safety contests conducted have resulted in materially lowering the number and seriousness of accidents.

One of the outstanding features of the safety contest was the establishment of a record for zero days, or days on which no accidents occurred. The company had a total of 117 such days in 1928. This means that the street cars and buses were operated about a third of the total number of days in the year without an accident of any kind. The goal which the company has set is to operate seven consecutive days without an accident. There were eight days in June, 1928, in which only one accident occurred, and in the last eleven days of December eight were operated without an accident. All the employees are now determined to make the seven consecutive days without an accident a reality. The result has been to stimulate a renewed interest in safety among all employees, which has materially lessened the number and seriousness of accidents in which the street cars and buses are involved.

Lower Insurance Rates In Effect

NEW fire insurance rate schedules for electric railways are now in effect in 42 states, according to the announcement made at a meeting of the committee on insurance of the A.E.R.A., held at Baltimore Jan. 10. In three other states the new schedule has been tentatively adopted and test applications are being made. In three additional states the schedule has not been filed because of litigation; and in one state there are no traction lines rated.

Fire Insurance Rate Schedule—Revision of May, 1929

In Use

Maine	North Carolina	Arkansas
New Hampshire	South Carolina	Nebraska
Vermont	Georgia	Oklahoma
Massachusetts	Florida	Texas
Connecticut	Alabama	Wyoming
Rhode Island	Mississippi	Colorado
New York	Louisiana	New Mexico
New Jersey	Ohio	Montana
Pennsylvania	Tennessee	Utah
Delaware	Indiana	Arizona
Maryland	Wisconsin	Washington
Dist. of Columbia	Illinois	Oregon
Virginia	Minnesota	California
West Virginia	Iowa	Nevada

Michigan, North Dakota, South Dakota — Tentatively adopted. Test applications being made.

NOTE— Missouri, Kansas, Kentucky — Because of litigation, schedule not filed.

Idaho—No traction lines rated.

Changes in this new schedule as compared with that previously in effect are as follows:

The base rate "A" for incombustible buildings has been reduced 50 per cent.

The base rate "B" on other structures has been reduced 16⅔ per cent.

More favorable treatment has been accorded buildings of superior construction (rated under base rate "A") and deficiency charges for such buildings have been lowered in numerous instances.

Occupancy charges for motor buses (items 31 t,u) have been lowered 25 per cent and 20 per cent respectively, with all occupancy charges reduced 50 per cent when in incombustible buildings.

Watchman deficiency charge has been reduced 50 per cent when base rate "A" is used.

External protection charges are reduced one-half when base rate "A" is used.

Deductions have been introduced for semi-steel cars.

A 33⅓ per cent reduction has been allowed in the base rate for rolling stock (1) on tracks and (2) in yards.

Charges covering defective wiring and heaters for cars on tracks have been reduced 50 per cent under stated conditions.

Digitized by Google

Baltimore Rate Decision

Sanctions Larger Earnings

United States Supreme Court approves 7½ to 8 per cent return on present fair value. Similar basis held to be proper for setting up depreciation

PRINCIPLES which may have a far-reaching effect upon the electric railways and the entire utility industry in this country were laid down in the recent decision of the United States Supreme Court in the rate case of the United Railways & Electric Company of Baltimore. Not only did the court sustain the primary contention of the company that a return of 7.44 per cent was no more than fair and reasonable but it went further and declared that a return of 7½ to 8 per cent is not unreasonable or excessive. Concerning depreciation, the second point at issue, the court stated specifically: "This naturally calls for expenditures equal to the cost of the worn-out equipment at the time of replacement; and this for all practical purposes means present value." The position previously taken by the court, that reproduction cost must be considered in determining valuation, was reaffirmed, but the wording of the decision was not specific and definite on this subject.

More than two years have elapsed since the first step was taken in the long series which led ultimately to the victory of the company in the nation's highest court. In August, 1927, the company applied to the Maryland Public Service Commission for an increase in fare from 7½ cents to 10 cents.

The old 5-cent fare remained in effect in Baltimore until 1918, when this rate was increased to 6 cents. In the following year it was raised to 7 cents with two tokens for 13 cents. On Jan. 1, 1920, the token rate was withdrawn, and the fare became 7 cents straight. This rate continued until 1924, when the company was authorized to increase it to 8 cents with two tokens for 15 cents. Even this failed to yield a fair return on the investment and the company therefore requested permission to charge a 10-cent flat fare.

In response to this application the commission in February, 1928, ruled that the company could charge a cash fare of 9 cents, with three tokens for 25 cents. At that time the commission fixed the depreciation charge at $883,544, basing it on original cost. The company took the case to the Circuit Court, which in May held the rates granted by the commission were confiscatory and that depreciation should be based on present value. The commission then filed an appeal and the case went to the Court of Appeals of Maryland.

The Court of Appeals reversed the Circuit Court and upheld the contention of the commission that a fare calculated to yield a return of approximately 6.26 per cent is adequate. In the matter of depreciation, however, the Court of Appeals upheld the lower court and overruled the contention of the commission that depreciation should be figured on the basis of original cost. Both sides then appealed to the United States Supreme Court, the company in order to secure a rate of return higher than 6.26 per cent and the commission in order to win its point that depreciation should be calculated on original cost.

The decision of the United States Supreme Court, announced on Jan. 6, 1930, sustained the decision of the Maryland Court of Appeals that depreciation should be calculated on present value, but reversed the latter's ruling that 6.26 per cent constitutes an adequate return. In discussing this subject the Supreme Court stated:

"The commission fixed a rate of fare permitting the company to earn a return of 6.26 per cent on this valuation; and . . . the case resolves itself into the simple question whether that return is so inadequate as to result in a deprivation of property in violation of the due process of law clause of the Fourteenth Amendment. In answering that question, the fundamental principle to be observed is that the property of a public utility, although devoted to the public service and impressed with a public interest, is still private property; and neither the corpus of that property nor the use thereof constitutionally can be taken for a compulsory price which falls below the measure of just compensation. One is confiscation no less than the other.

"What is a fair return within this principle cannot be settled by invoking decisions of this Court made years ago based upon conditions radically different from those which prevail today. The problem is one to be tested primarily by present-day conditions. Annual returns upon capital and enterprise, like wages of employees, cost of maintenance and related expenses, have materially

There is much evidence in the record to the effect that in order to induce the investment of capital in the enterprise or to enable the company to compete successfully in the market for money to finance its operations, a net return upon the valuation fixed by the commission should be not far from 8 per cent.

—From decision of U. S. Supreme Court.

Digitized by Google

increased the country over. This is common knowledge. A rate of return upon capital invested in street railway lines and other public utilities which might have been proper a few years ago no longer furnishes a safe criterion either for the present or the future. Nor can a rule be laid down which will apply uniformly to all sorts of utilities.

It is manifest that just compensation for a utility, requiring for efficient public service skillful and prudent management as well as use of the plant, and whose rates are subject to public regulation, is more than current interest on mere investment.

—From decision of U. S. Supreme Court.

What may be a fair return for one may be inadequate for another, depending upon circumstances, locality and risk. The general rule recently has been stated in Bluefield Co. vs. Pub. Serv. Comm., 262 U. S. 679, 692-695:

"What annual rate will constitute just compensation depends upon many circumstances and must be determined by the exercise of a fair and enlightened judgment, having regard to all relevant facts. A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties. A rate of return may be reasonable at one time and become too high or too low by changes affecting opportunities for investment, the money market and business conditions generally.

. . . . . .

"Investors take into account the result of past operations, especially in recent years, when determining the terms upon which they will invest in such an undertaking. Low, uncertain or irregular income makes for low prices for the securities of the utility and higher rates of interest to be demanded by investors. The fact that the company may not insist as a matter of constitutional right that past losses be made up by rates to be applied in the present and future tends to weaken credit, and the fact that the utility is protected against being compelled to serve for confiscatory rates tends to support it. In this case the record shows that the rate of return has been low through a long period up to the time of the inquiry by the commission here involved."

"What will constitute a fair return in a given case is not capable of exact mathematical demonstration. It is a matter more or less of approximation about which conclusions may differ. The court in the discharge of its constitutional duty on the issue of confiscation must determine the amount to the best of its ability in the exercise of a fair, enlightened and 'independent judgment as to both law and facts.' . . .

"There is much evidence in the record to the effect that in order to induce the investment of capital in the enterprise or to enable the company to compete successfully in the market for money to finance its operations, a net return upon the valuation fixed by the commission should be not far from 8 per cent. Since 1920 the company has borrowed from time to time some $18,000,000, upon which it has been obliged to pay an average rate of interest ranging well over 7 per cent and this has been the experience of street railway lines quite generally. Upon the valuation fixed, with an allowance for depreciation calculated with reference to that valuation, and upon the then prescribed rates, the company for the years 1920 to 1926, both inclusive, obtained a return of little more than 5 per cent per annum. It is manifest that just compensation for a utility, requiring for efficient public service skillful and prudent management as well as use of the plant, and of which the rates are subject to public regulation, is more than current interest on mere investment. Sound business management requires that after paying all expenses of operation, setting aside the necessary sums for depreciation, payment of interest and reasonable dividends, there should still remain something to be passed to the surplus account; and a rate of return which does not admit of that being done is not sufficient to assure confidence in the financial soundness of the utility to maintain its credit and enable it to raise money necessary for the proper discharge of its public duties. In this view of the matter, a return of 6.26 per cent is clearly inadequate. In the light of recent decisions of this Court and other federal decisions, it is not certain that rates securing a return of 7½ per cent or even 8 per cent on the value of the property would not be necessary to avoid confiscation. But this we need not decide, since the company itself sought from the commission a rate which it appears would produce a return of about 7.44 per cent, at the same time insisting that such return fell short of being adequate. Upon the present record, we are of opinion that to enforce rates producing less than this would be confiscatory and in violation of the due process clause of the Fourteenth Amendment."

From these views Mr. Justice Brandeis and Mr. Justice Holmes dissented. Their dissent, however, appears to have been based upon a difference of opinion concerning valuation and proper allowance for depreciation rather than upon the belief that a return of 6.26 per cent is adequate. In fact, Justice Brandeis' statement refers to a return of 7.78 per cent upon the figure which he considers to be the fair value of the property.

Concerning the method which should be used in setting up depreciation the language of the decision is explicit. The Court states:

"The allowance for annual depreciation made by the commission was based upon cost. The Court of Appeals held that this was erroneous and that it should have been based upon present value. The court's view of the matter was plainly right. One of the items of expense to be ascertained and deducted is the amount necessary to restore property worn out or impaired, so as continuously to maintain it as nearly as practicable at the same level of efficiency for the public service. The amount set aside periodically for this purpose is the so-called depreciation allowance. Manifestly, this allowance cannot be limited by the original cost, because, if values have advanced, the allowance is not sufficient to maintain the level of efficiency. The utility 'is entitled to see that from earnings the value of the property invested is kept unimpaired, so that at the end of any given term of years the original investment remains as it was at the beginning.' . . . This naturally calls for expenditures equal to the cost of the worn-out equipment at the time of replacement; and this, for all practical purposes, means present value. It is the settled rule of this Court that the rate base is present value, and it would be wholly illogical to adopt a

Digitized by Google

different rule for depreciation. As the Supreme Court of Michigan, in Utilities Commission vs. Telephone Co., 228 Mich. 658, 666, has aptly said: 'If the rate base is present fair value, then the depreciation base as to depreciable property is the same thing. There is no principle to sustain a holding that a utility may earn on the present fair value of its property devoted to public service, but that it must accept and the public must pay depreciation on book cost or investment cost regardless of present fair value. We repeat, the purpose of permitting a depreciation charge is to compensate the utility for property consumed in service, and the duty of the commission, guided by experience in rate making, is to spread this charge fairly over the years of the life of the property.' "

It is the settled rule of this Court that the rate base is present value, and it would be wholly illogical to adopt a different rule for depreciation.

—From decision of U. S. Supreme Court.

From this opinion Justices Brandeis and Holmes again dissent and also Mr. Justice Stone in a separate opinion. Their objections appear to be based on general disagreement with the reproduction cost theory of valuation, and present value as the basis for depreciation allowance.

In the matter of valuation the language of the decision is open to some difference in interpretation. The statement is made that "it is the settled rule of this court that the rate base is present value." In the opinion of lawyers representing the United Railways & Electric Company, this is a reaffirmation of the stand taken by the Court in the St. Louis & O'Fallon Railroad case when it upset the valuation of the Interstate Commerce Commission because sufficient consideration had not been given to the matter of reproduction cost. It appears also to refer back to the Indianapolis Water Company case wherein the Supreme Court held "if the tendency or trend of prices is not definitely upward or downward and it does not appear probable that there will be a substantial change of prices, then the present value of lands plus the present cost of constructing the plant, less depreciation, if any, is a fair measure of the value of the physical elements of the property."

The exact procedure for putting into effect the decision of the United States Supreme Court remains in doubt at this time. It appears probable that the United States Court will transmit its rulings to the Maryland Court of Appeals and thence to the Circuit Court, resulting in the issuance of a permanent injunction to restrain the Public Service Commission from interference with the collection of a 10-cent flat fare by the United Railways & Electric Company of Baltimore.

Engineering Executive Committee Receives Committee Reports

SEVERAL subjects of importance were taken up at the regular meeting of the executive committee of the American Electric Railway Engineering Association held in New York on Jan. 9, 1930.

Reports were received from the standing committee in charge of the several divisions of association work, and it appeared evident from them that every effort is being made to speed the reports this year to have them ready in time for the annual convention to be held in June.

On account of the withdrawal of the New York State Railways from the American Electric Railway Association, F. McVittie tendered his resignation from the Engineering executive committee. His resignation was accepted with regret. To fill the vacancy thus created Walter Bryan, superintendent of power, St. Louis Public Service Company, was nominated and unanimously elected. It was provided, however, that the remaining members of the executive committee be advanced in positions, since Mr. McVittie was a ranking member at the time of his resignation.

Resolutions were presented and adopted on the death of G. W. Palmer, Jr., who was the only honorary member ever elected by the executive committee of the Engineering Association.

A number of matters pertaining to the American Standards Association were taken up. Having completed this assignment the committee on special track work was discharged. C. W. Squier was appointed as the association's representative on the committee on machine pins. On the subject of hacksaw blades the proposed standardization prepared by E. P. Goucher was adopted for submission to the American Standards Association. On account of the proposed change in the method of testing steel and malleable iron pipe unions of standard weight, this subject also was referred back to Mr. Goucher. New designs of axles which were proposed were withheld from the Manual pending a discussion with the American Railway Association.

Considerable discussion developed relative to the program of the annual convention to be held in San Francisco next June. According to the plan adopted by the American Association, sessions of the Engineering Association will be held Monday and Wednesday afternoons and Thursday morning. As to the division of time among various subjects, the matter was left to the committee on convention program, of which F. H. Miller is chairman.

Discussion developed as to whether the subjects of motor buses and wood preservation should be reorganized as separate divisions of the Engineering Association, instead of special assignments under the rolling stock and way and structures divisions, respectively. This was referred to a committee consisting of A. T. Clark, chairman; P. V. C. See, and E. M. T. Ryder.

Revisions of the constitution and by-laws and the rules and regulations for committees were adopted at the last convention and referred to a committee on editing consisting of R. C. Cram and C. R. Harte. A report of the committee on editing was presented by Mr. Cram. The proposals were principally changes in wording to clarify the meaning and to insure uniformity. They were tentatively approved by the executive committee for printing in proof form and submission to the membership for approval.

Members present at the meeting included President W. W. Wysor, Vice-presidents L. D. Bale and C. H. Jones, Secretary-treasurer G. C. Hecker, E. M. T. Ryder, H. H. George and A. T. Clark. T. H. Nicholl, C. S. Stackpole, L. C. Winship and R. C. Cram, representing committees, A. W. Baker of headquarters staff and Morris Buck of ELECTRIC RAILWAY JOURNAL also were present.

Digitized by Google

New Albany Car Includes Many

By

R. S. BEERS

Transportation Engineering Department
General Electric Company

DIFFERENCES of many kinds from conventional designs are found in the new car which has been operating for some little time on the lines of the United Traction Company, Albany, N. Y. The outstanding features are the extensive use of aluminum and its alloys in the body construction, and the driving motors and type of control.

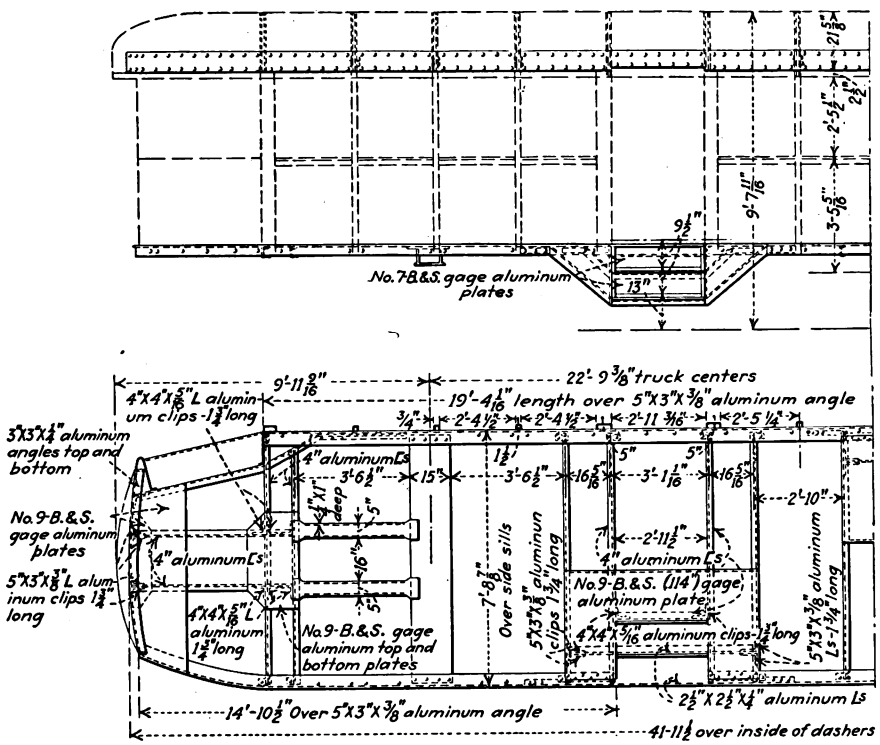
Particular care has been taken to make the car interior attractive. The miscellaneous parts of the electrical equipment, such as the control devices and switches, have been grouped and placed in a cabinet in each vestibule, with a convenient table top which not only conceals the equipment but provides a place for the operator to lay his transfers, punch and other paraphernalia.

Tests made have shown that the service performance of the car is also somewhat unusual. The free running speed is 32 m.p.h., which is attained with a rate of acceleration on the control points of 3.5 m.p.h.p.s. Stops with the service brake are at the rate of 2.5 m.p.h.p.s., but when emergency braking is used, combining both air and magnetic devices, the rate obtained may be as high as 6 m.p.h.p.s.

In order to obtain minimum weight, aluminum and its alloys have been used extensively in the car body and framing, many parts being made entirely of such materials. In the following discussion, where aluminum is referred to it is understood that the term includes not only pure aluminum, but the various alloys of the metal which have been brought out by the Aluminum Company of America and which have been designated by it as suitable for the part in question.

The side sills are formed of 3x5x$\frac{3}{8}$-in. aluminum angles, extending in one continuous piece from front body corner posts to center exits and from center exits to rear vestibule corner posts on both sides of the car. The cross sills are formed of 4-in. aluminum channels. These are fastened to the underside of the side sill angle. The body end sills are formed of two 4-in. aluminum channels spaced on $10\frac{5}{16}$-in. centers, fastened to the body side sills with top and bottom center gusset plates riveted to the end sills and platform center sills.

The center exits are reinforced with additional longitudinal sills and plates, forming a step well. A 4-in. aluminum channel is placed at the junction between the floor plate and the top step well. This runs the full length of the center exit and is connected by angle clips to the body cross sill and riveted to the floor plate. The center exits each have a floor cover plate of No. 9 gage aluminum, flanged on the inside, and extending from within 4½ in. of the center line of the car to the side sills and between the main body cross sills on the two sides of the center exit. The step hangers, risers and tread plates are formed of No. 7 gage aluminum flanged at the ends.



Aluminum is used extensively in the framing of the Albany car. Rolled, extruded and cast sections of various alloys are employed

General Dimensions of the Albany Car

	Ft.	In.
Length over all	42	8½
Length over dashers	41	11½
Length over body	32	11½
Length of platforms	4	5 13/16
Bumper projection		4½
Truck centers	22	9⅜
Wheelbase of truck	5	4
Wheel diameter		26
Post centers		30
Vestibule door openings between posts	4	0½
Side exit door openings, between posts	2	11 5/16
Width over all	8	2½
Width over side sills	7	8½
Width over vestibule corner posts	7	0⅜
Width of aisle		22
Width of seats		35
Height, rail to top of trolley boards	9	11 5/16
Height, rail to under side of sill		27 5/16
Height, rail to bottom of apron		23½
Height, floor to headlining	6	9½
Height, rail to first step, end door		17
Height, first step to platform, end door		15
Height, rail to first step, center exit		13
Height, first step to second step, center exit		9½
Height, second step to car floor, center exit		9½
Seating capacity	44	

Digitized by Google

Innovations

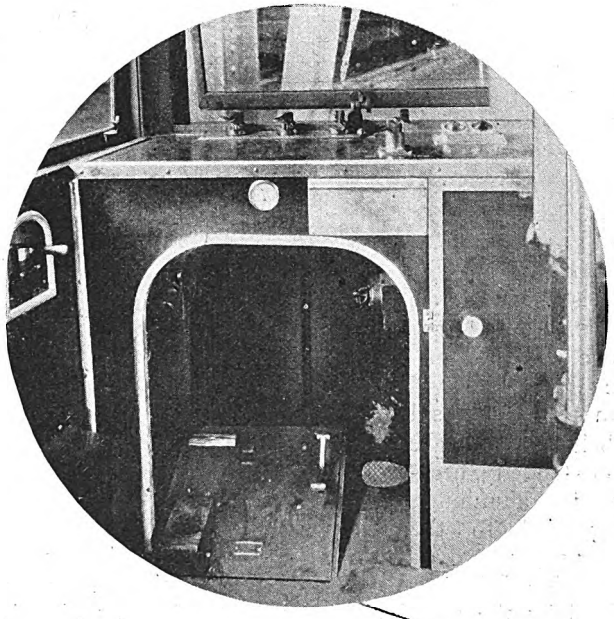
The open side of the platform is supported by a built-up knee, formed of No. 7 gage aluminum plate pressed to shape. The top and bottom edges of these knees are reinforced by a 2x2x$\frac{1}{4}$-in. steel angle riveted to them. The knees are further braced with a No. 7 gage aluminum hanger plate, flanged on the inside edge for connecting to the knee and then around the outside of the side sill angle.

The center sills at the front and rear ends of the car extend through the body end sill to the buffer sills, and are formed of 4-in. aluminum channels, connected with angle clips. The body end sills are further braced with two $\frac{1}{4}$-in. pressed 5-in. aluminum channels laid flatways and extending from the end sill to the body bolsters being bolted to them. The closed side of the platform is formed by a continuation of the side sill angles. The platform ends at each end of the car are reinforced with No. 9 gage aluminum nosing plates for the full width of the car and some 20 in. deep.

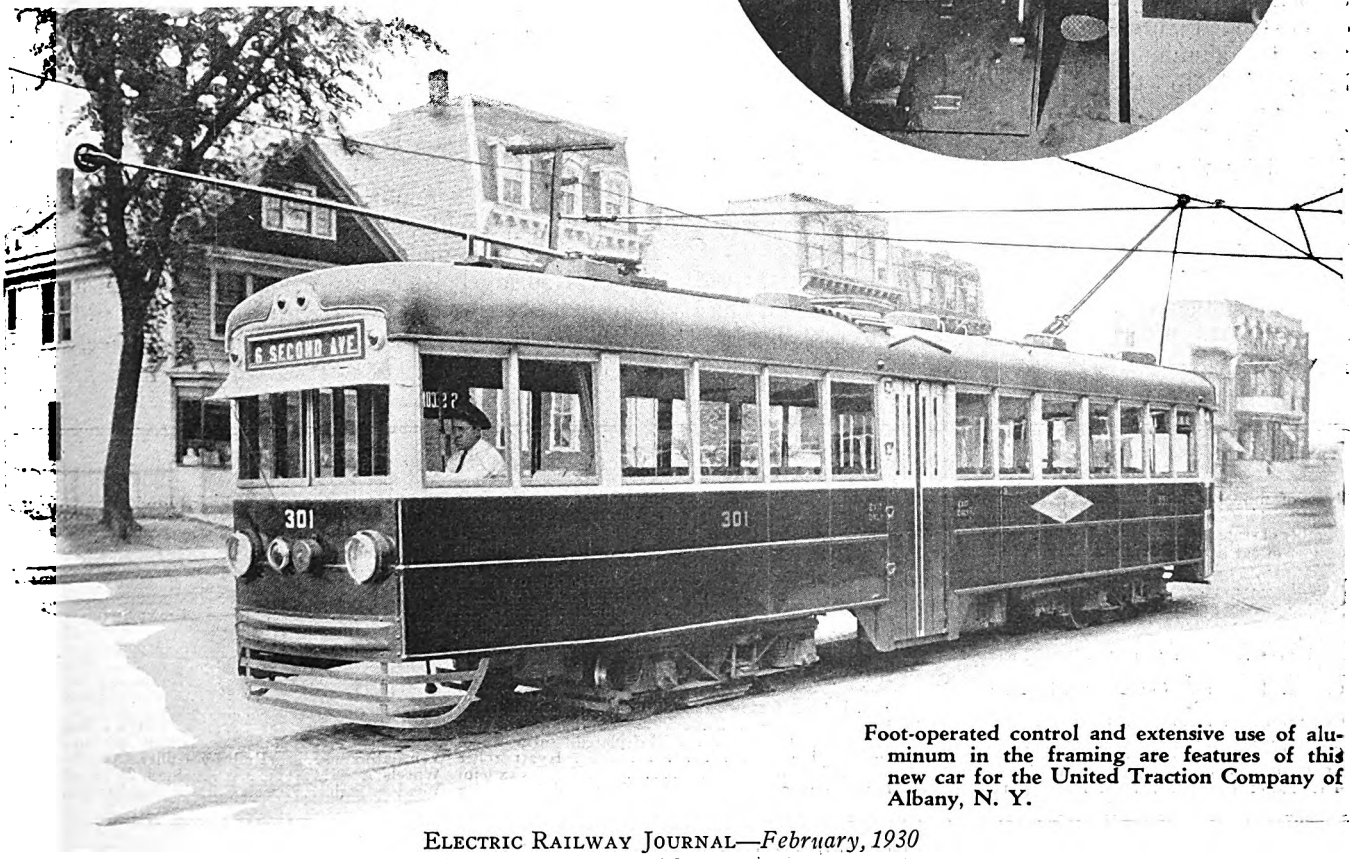
Body Framing Is of Aluminum

The body framing also is of aluminum construction. The material includes cast, rolled and extruded sections, heat treated. The side posts are of extruded "U" shaped sections extending from side sill to side plate, bolted and clipped to the side sills. The truss braces between each pair of side posts are of built-up construction, consisting of an aluminum belt rail or sash-rest casting, a body side plate casting and a No. 14 gage, heat-treated aluminum flanged plate riveted to the side sill angle. These individual truss frames form the side body construction and extend from body pier posts to center exit pier posts on both sides of the car. On the closed side of the vestibule cast aluminum belt rails are used, bolted to the corner vestibule posts and body pier posts. These castings have lugs which permit steel diagonal bracing to be used. The side body girder plates and letterboards are of 18 gage aluminum plates held in place by aluminum moldings bolted to the side posts.

The body side posts are fastened to the roof carlins by cast aluminum shoes bolted to them, forming a continuous member from sill to sill. The side posts are finished on the inside of the car by extruded aluminum pilasters.

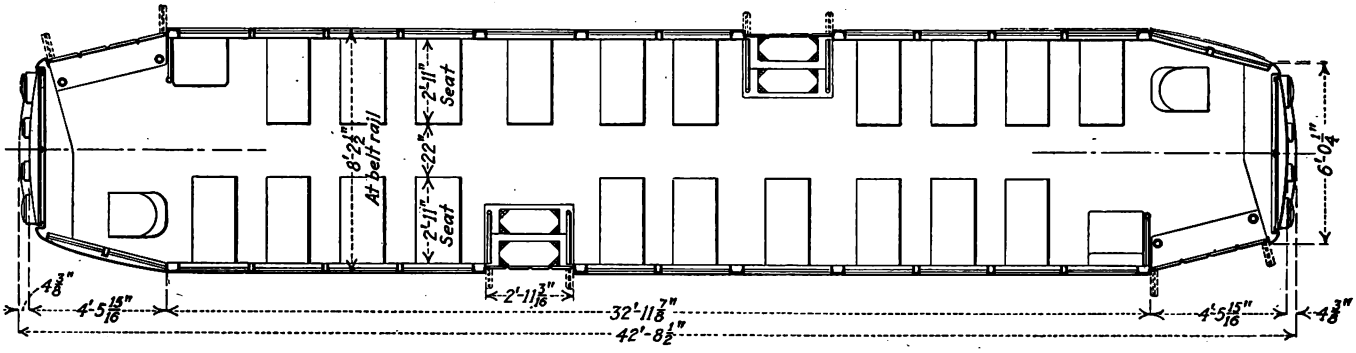


The main controller is placed beneath the car floor, the master control being actuated by the left foot. The right foot governs the reverser and the air brake. Only auxiliary devices have to be controlled by hand



Foot-operated control and extensive use of aluminum in the framing are features of this new car for the United Traction Company of Albany, N. Y.

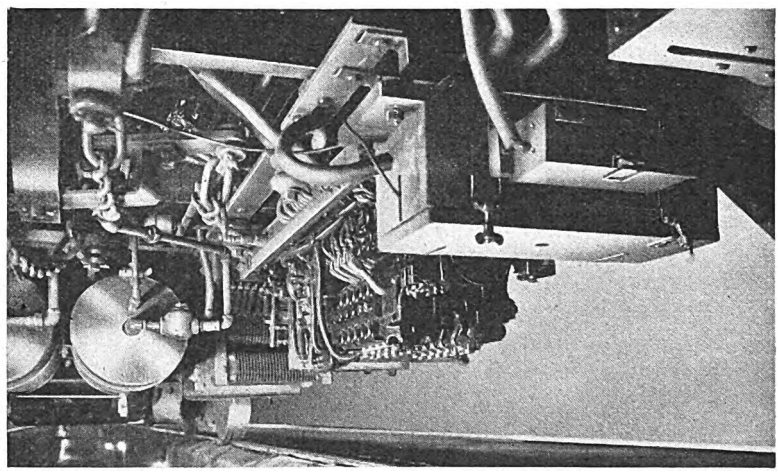
Digitized by Google



The Albany car is designed to permit of easy entrance and exit.

The body corner piers and exit door piers are finished of pressed sheet aluminum pilasters.

The roof is of the arch type with vestibule hoods at each end. A channel shape extruded aluminum carlin is located at each side window and door post, and the ends of these carlins are fastened to the side plate bracing and window posts by cast aluminum brackets. The body roof is sheathed with $\frac{5}{16}$-in. Haskelite the full width of the roof, and in five window-length sections. The hoods are sheathed with $\frac{5}{16}$-in. Agasote cast in two pieces. The outside of the roof is covered with canvas.



The controller, reverser, resistors and other equipment are placed under the car convenient for inspection from the pit or the side

The center vestibule posts extend from the buffer sill to belt rail and are of extruded heat-treated aluminum, being tied to the corner posts by diagonals of 2x$\frac{1}{4}$-in. flat steel bar braces. The inside finish of the vestibule below the windows is formed by the aluminum equipment cabinet, while the side vestibule finish is of No. 18 gage aluminum plate. A sign box of cast aluminum is built into the vestibule hood.

The headlining is No. 18 gage aluminum sheet curved to the contour of the roof, jointed on the carlins and covered with aluminum moldings. The advertising card racks are made of No. 18 gage aluminum, forming an extension to the headlining sheets. The edges are covered with aluminum moldings grooved to take standard car cards the full length of the car body.

The doors are made of cherry. Post cappings, pier cover plates and moldings are of aluminum. The wainscoting below the windows consists of aluminum plate. The window stooling is an extension of the cast aluminum truss brace finished with cherry capping.

Besides the main framing, aluminum is used in a number of details on the car. Spacer rings for the head lamps and housing rings for the marker lights are made of aluminum, as is the sander reservoir.

The seats are of the walk-over type, with a welt divided back. The chair for the motorman is of the bucket type and is adjustable vertically and longitudinally. The seats are upholstered in brown Spanish leather.

The car body is mounted on Cincinnati passenger type arch bar trucks, with spring pedestal cantilever type journal boxes and combination rubber cushions and semi-elliptical spring bolster suspension. The trucks are designed to operate on curves with a minimum radius of 30 ft. The wheelbase is 5 ft. 4 in., and the wheel diameter is 26 in.

General Specifications of Equipment of the Albany Car

Type of unit	One man, motor, passenger, city double-end, double truck
Number of seats	44
Builder of car body	Cincinnati Car Corp., Cincinnati, Ohio
Weight	32,000 lb.
Body	Aluminum
Roof	Arch
Doors	Folding, center and end
Air brakes	General Electric, foot-operated
Axles	Special
Car signal system	Consolidated buzzer and single stroke bells
Compressors	General Electric CP-27B
Conduit	Flexible duct
Control	General Electric PCM
Couplers	Railway standard drawbar
Destination signs	Hunter, end and side
Door mechanism	Consolidated Car Heating Co., with treadles at center doors
Fare boxes	Johnson, electrically operated
Finish	Ripolin
Floor covering	Flexolith, ¼ in.
Gears and pinions	General Electric, heat-treated
Glass	Protex, ¼ in. for vestibule DSA for body
Hand brakes	Cincinnati Car Corp.
Gongs	Crewson pneumatic
Hand straps	Leather, white sanitary grips
Heat insulating material	Cork
Heaters	20 inclosed, 500 watts, thermostatic control
Headlights	Golden Glow
Headlining	Aluminum, 18 gage
Interior trim	Nickel-plated, satin finish
Journal bearings	Hyatt roller
Journal boxes	3 x 6 in.
Lamp fixtures	Standard, 20 in series
Motors	Four, GE-265, inside hung
Painting scheme	Red and cream
Roof material	Haskelite; Agasote in hoods
Safety car devices	Safety Car Devices Co.
Sash	Curtain Supply Co., brass
Seats	Hale & Kilburn Walkover
Seat spacing	30 in.
Seating material	Brown Spanish leather
Slack adjusters	Turn buckles
Stanchions and rails	Monel metal pipe
Steps	Stationary
Stop lights	Keystone
Step treads	Kass safety
Trolley catchers	Earll
Trolley base	Ohio Brass Co.
Trucks	Cincinnati arch bar
Ventilators	Railway Utility Co., New Era
Wheels	Steel, 26 in. diameter
Window sash	Curtain Supply Co., brass

Digitized by Google

Power for driving the car is obtained from four GE-265 motors, one on each axle. These motors are rated at 35 hp. each and make it possible to maintain a high schedule speed. The motors are of the standard, self-ventilated type, geared for a free running speed of 32 m.p.h. at 550 volts. The gear ratio is 68: 15.

Arrangements have been made for foot operation of the G.E. Type PCM control. In practice it has been found that this control has all the flexibility of the hand-operated Type K. The operator can choose practically any speed he desires by stopping on the resistance notches. This may be done by the movement of his foot on the control pedal. Since the brake is controlled with the other foot both hands are free for making change, punching transfers and similar purposes, thus reducing the duration of the stops.

The control was developed to meet the requirements of street railways for faster acceleration without discomfort to the passengers. In general, this improvement has been obtained by increasing the number of resistance steps permitting small increments of accelerating current with a comparatively short time interval on each step and for the total operation. In normal service accelerations as high as 3.5 m.p.h.p.s. are secured. There are nine steps in series and nine in parallel on the main controller. The action is automatic, the master controller having three points, known as switching, series, and parallel. When the operator presses his foot down to the full parallel position the control notches up under the direction of an accelerating relay.

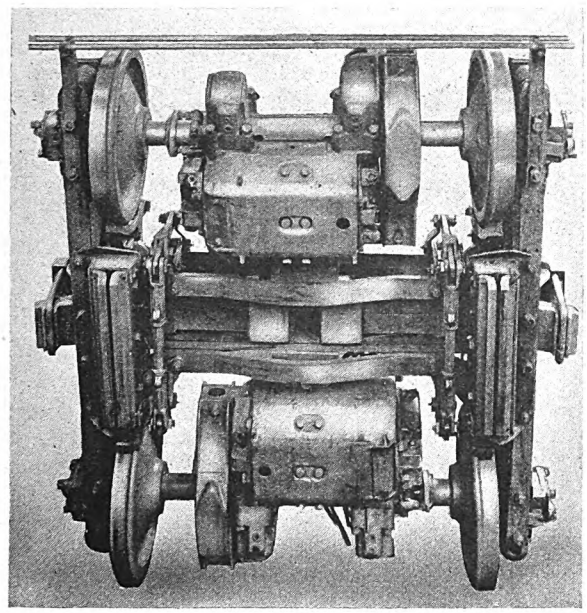
The line breaker, contactors and all of the main control equipment are in a box underneath the car, while the foot-operated master controller is recessed into the toe board. The main contacts are locked in the off position when the reverse lever is removed, just as in the usual hand controller. Normally the acceleration of the car is controlled by the pedal, and, in addition, there is a pilot valve operated by the heel plate which cuts off power in an emergency and applies both air and magnetic brakes.

The air brakes are of the straight air type with an emergency feature. The usual hand valve is replaced by a foot-operated control valve of the automatic lap type. The novel feature of this valve is that when the pedal is put in any braking position and held there, a definite pressure will be built up and maintained in the brake cylinder without moving the pedal back to a lap position. In other words, the amount of pressure built up depends on the distance the pedal is depressed. There is also a lock so that the pedal may be placed in the full service position and held there, as when the operator is changing ends.

Supplementary braking is obtained by the magnetic track brakes. These consist of four electromagnets mounted between the wheels of each truck. Normally they clear the rail head but they can be lowered on the head and magnetized at the will of the operator. The magnets are energized directly from the trolley and are controlled through the intermediary of pneumatic valves. The retardation obtained by these brakes is thus independent of the motors and control. It does not in any way reduce the effectiveness of the air brakes.

In an emergency both the air and magnetic brakes function together, such a combination allowing for very fast braking without the sacrifice of flexibility or ease of operation. Although the full braking effort is not needed at every stop the operator takes greater advantage of his high accelerating rate when he knows that he can follow more closely behind traffic and get a high rate of retardation if needed.

A bell ringer, a sander and the magnetic track brake are each operated by individual hand valves. The supply of air to these valves is automatically cut off when the pedal is locked so that a passenger on the rear platform cannot tamper with them. Compressed air for operating the control and the auxiliaries is furnished by a CP-27, 15-cu.ft. compressor, suspended beneath the car.



Under side of the truck, showing the method of mounting the motors and wheel brakes. The double bars between the wheels are the shoes of the magnetic track brakes which may be pulled against the rails independently of the air brakes

Two circuits, each consisting of twenty lamps in series, furnish illumination for the car interior and for the headlight, destination signs and markers. The lighting fixtures are of the dome type with provision for short-circuiting a defective lamp. A novel feature is that when the motor reverser is turned in changing ends the headlight and other indication lamps are reversed without further attention from the operator.

Straight pneumatic control is used for the door at the motorman's platform, while the center door is handled with automatic treadle control. A four-position rotary valve enables the motorman to select the door-opening combination that he desires. A signal lamp in front of the motorman indicates whether the center door is closed. The door engines are of the direct stroke differential type mounted above the door. Each engine operates a two-leaf door.

The signal buzzer is operated by a pull switch and a cord running down each side of the car. In addition there is a single stroke bell with a push button near the center door so that the passenger can signal the motorman.

There is a conventional stop light on each end of the car, and in addition red lamps are placed over each door connected in the same circuit with the stop light. By this means automobile drivers as well as persons inside of the car, are warned that a stop is about to be made.

The development of this new type of car was initiated by the United Traction Company of Albany, N. Y., which furnished unusual assistance and co-operation to the manufacturers in suggestions and practical demonstrations in operation. The car and trucks were built by the Cincinnati Car Corporation and the electrical equipment was furnished by the General Electric Company.

Digitized by Google

CORRECT TIMING OF

Essential in

Traffic Regulation

PART ONE

THE utility of any traffic signal system depends upon the accuracy with which the system is adjusted or timed to fit the traffic requirements. An examination of the characteristics of traffic flow shows that there are certain demands which should be satisfied in so far as the fluidity and safety of traffic movement is concerned. These may be set forth as follows:

Signals should be timed (1) so as to prevent or reduce to a minimum the accumulation of traffic in any block or series of blocks; (2) in accordance with the relative volume of traffic flow per lane at each intersection; (3) so as to permit in so far as possible the flow of traffic at the speed which is normal for the area traversed; (4) so as to vary with the traffic speed and with the volume throughout the traffic day; (5) so as to prevent, or reduce to a minimum, the simultaneous flow of conflicting streams of traffic, for both vehicular and vehicular with pedestrian movements.

All of these requirements, with the exception of the third, are or may be present at even the simplest type of signal installation—the isolated, independently controlled intersection. Therefore, the problems which arise on an individual intersection must be solved before the problems of a traffic control system can be taken up.

Establishing the Ratio of Times

With respect to any one stream of traffic which flows into a signalized intersection the function of the controlling signal is to *allow* or to *prohibit* the flow of that traffic stream. The relative amounts of time which the signal gives to the controlled stream of traffic to go and to stop form a ratio of time division. Several factors influence the selection of a ratio of time division. The amount of traffic flow in each direction is certainly basic in establishing this ratio. The width of roadway or the number of lanes in which traffic flows is likewise important. The character of the traffic, the nature of the movement and the channelization of flow are factors to be considered.

In this discussion, a simple right-angle intersection is taken for sake of simplicity. Assume all things are equal except the width of the intersecting roadways.

Ignoring clearance periods the proper ratio of movement time for flow of traffic on one street at the intersection with another varies inversely as the roadway widths of the intersecting streets expressed in pairs of traffic lanes. A simple method of application of this principle is to reduce all traffic streams to vehicles per lane on each roadway and then treat all roadways alike.

Let us next assume all things equal except the volume of traffic flow. In this instance the ratio of time divisions varies directly as the traffic flow.

Where complex intersections are dealt with, roadway widths of unequal numbers of lanes can be treated as described above. That is, the traffic flow on all roadways is reduced to vehicles per lane and hence all roadways are reduced to equal terms and treated equally. The division of the cycle then varies directly as the flow per lane. Each artery is then given its part of the available time and is described by its flow per lane divided by the sum of all the other arteries' flow per lane. The available time is ordinarily described as the time of each cycle less the clearance periods. These are discussed later.

The art of traffic engineering has not as yet developed to a point where it is possible to determine accurately the effect on the ratio of time division of such things as the character of traffic flow and the nature of the traffic movement.

The clearance or caution period which is usually indicated either by an amber or by a red light is one of the most important items in the make-up of the complete cycle. As the name of the *clearance* period implies, its primary purpose is to clear the intersection of vehicles and pedestrians that have been moving in one direction at an intersection *in time so as to prevent conflict.* This may mean that the intersection is entirely clear before cross-flow is released, or in any case that the cross-streams are released only after *a sufficient length of time after the clearing stream has been stopped* so as *to prevent conflict.* While the clearance period is largely a safety measure, it is designed to produce both smooth and safe operation.

In analyzing these requirements of the clearance period, it is seen that the length of the clearance time is expressed by speeds, distances and stopping times. The length of time required to stop a vehicle is significant in establishing the clearance period. If a stream of traffic which is flowing through an intersection is to be stopped, a sufficient warning time must be given because of the "inertia" effect. That is to say, a moving vehicle cannot be stopped instantly. As a minimum time, then, the clearance period should be long enough so as to permit stopping the vehicles which have been moving. At 20 m.p.h., a speed now accepted for traffic movement in nearly every urban center, a vehicle with adequate

Digitized by Google

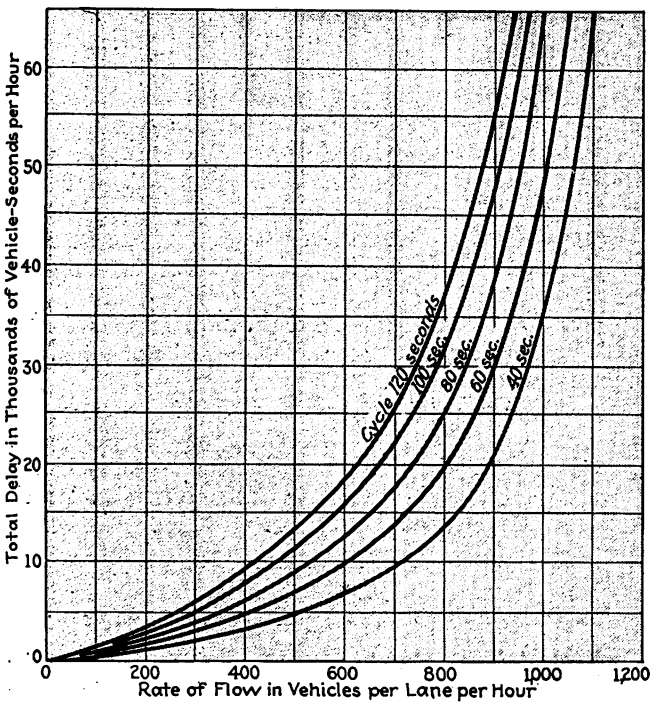
SIGNALS

Factors influencing the time ratio and length of cycle at a single intersection are discussed in this article. Timing for signal systems covering a number of intersections will be discussed in a future article

By

Theodore M. Matson

Chief Engineer City-Wide Traffic Committee
Kansas City, Mo.



Short signal cycles cause less delay than long cycles

brakes can be stopped safely in a distance of 50 ft. and a time of 3.4 seconds. Any vehicle which is closer to the stop line of a signalized intersection than 50 ft. at the instant the caution period begins, would proceed across the intersection. (It is noteworthy that this distance is usually less than the width of the intersection.)

At a simple right-angle intersection the minimum time required for a vehicle to clear the intersecting street may be determined as follows:

Let W = Intersecting street width in feet
V = Speed of clearing vehicle in miles per hour
T' = Clearance time in seconds.

Then $$T' = \frac{W}{\left(\frac{5280\,V}{3600}\right)} = \frac{3600\,W}{5280\,V}$$

$$= \frac{0.682\,W}{V}$$

If the clearing vehicle is 50 ft. or less from the intersection when the signal is thrown and is traveling at 20 m.p.h. it will require additional time. In general if D is the minimum safe stopping distance the maximum clearance time required by a vehicle is

$$T = \frac{0.682}{V}(W + D)$$

At complicated intersections there exists frequently a length of free path from the place the cross-flow vehicles are stopped to the point where these vehicles would conflict with the clearing stream; therefore a deduction can be made from the above clearance time.

If d = length of free path in feet to clearing stream
v = average speed of the accelerating cross-flow in miles per hour
and t = amount of time to be deducted

$$t = \frac{0.682}{v}\,d$$

and the clearance time becomes

$$T = \frac{0.682}{V}(W + D) - \frac{0.682}{v}\,d$$

The above equations apply to vehicles only. Usually, however, the pedestrians are requested to obey signals and in these cases a sufficient length of time must be set aside for clearing the pedestrian streams out of danger from released cross-flow vehicles. It is readily seen that, due to the slow movement of pedestrians, the clearance period demanded by them will usually be larger than required by vehicles.

Consider the movement of pedestrians at an intersection across the street in the direction, with respect to the center, which is counter-clockwise. The most severe condition results when this group of pedestrians will have left the curb at an instant prior to the beginning of the clearing period and will be directly in front of the cross-flow vehicles waiting release at the end of the caution period. If no safety zones or isles are provided in the roadway and no parking lanes exist, the distance which these pedestrians must clear during the caution period is the width of the roadway, and, the average walking speed being about 5 ft. per second, the time required would be about one-fifth of this distance expressed in feet. Of course, if safety isles or other places exist in the roadway over which there is no vehicular movement the distance to be cleared is accordingly reduced.

The cycle length to be determined must include the various components which have been discussed heretofore. The total length of the cycle must be adequate to care properly for each of these components. In choosing a length of cycle for an isolated or independent signal installation there is no factor on which to base the cycle length, as is the case in a signal system where the length of cycle must be based on the correlated flow of traffic. The standards set forth in the recommendation of the American Engineering Council, however, set the limits of cycle lengths between 40 seconds and 80 seconds as good practice.

It may be proved mathematically that in any cycle the total delay equals the number of vehicles stopped times half the sum of the delays to the first vehicle and the last vehicle.

The total hourly delay experienced by one lane of

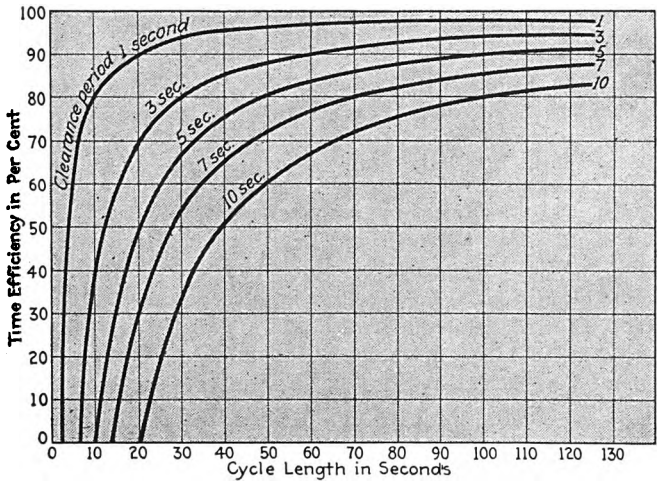
Digitized by Google

traffic is, of course, equal to the cyclic delay multiplied by the number of cycles per hour. What this amounts to under various conditions is shown in the following table in which the time spacing of departures is assumed to be three seconds:

Delay in Vehicle Seconds Per Hour Per Lane

Vehicles per Hour	Cycle Length in Seconds 40	60	80	100	120
200	1,170	1,980	2,565	3,095	3,780
400	3,420	4,950	6,440	7,925	9,450
600	6,940	9,900	12,915	15,890	18,900
800	13,780	19,800	25,820	31,810	37,800
1,000	36,200	49,500	64,450	79,500	94,500

The time savings of shorter cycles on this basis are evident from the chart on page 83. Of course, the increments in total delay for any cycle length become proportionately heavy for high densities. It will be noted that, making these assumptions, when the rate of flow reaches 1,200 per hour the total delay experienced by any stoppage to the traffic streams is infinite.



Time efficiency with respect to cycle length and clearance

In connection with the choice of cycle lengths it is of interest to note the effect of clearance periods on the useful time that a signal can deliver for various cycle lengths.

Let E = Efficiency or per cent time given to passing additional traffic
C = Cycle length
P = Clearance period
If P is the same for both directions

$$E = \frac{C - 2P}{C}$$

That is, the per cent efficiency of available traffic flow time is equivalent to the total time minus the losses, divided by the total time. This is shown graphically on the chart on this page.

Now, if a part of the traffic wave is temporarily stopped, the first part of the green period, when vehicles pass at capacity spacing, is more valuable than the latter part.

Since the caution period comes at the end of the green period, the subtraction of a few seconds from the green period, which are given over to the caution period, does not materially affect the efficiency of the operation. This is true where traffic is temporarily stopped before the green light shows. However, for continuous movement of the traffic waves, all parts of the green period are equivalent in terms of vehicles.

A.E.R.A. Executive Committee Holds Cleveland Meeting

COINCIDENT with the Annual Meeting of the Central Electric Railway Association, a meeting of the executive committee of the American Electric Railway Association was held at Cleveland on Jan. 24. J. H. Hanna, first vice-president, presided in the absence of President Shoup. Plans for the 49th annual convention of the American Electric Railway Association, to be held at San Francisco, June 23-26, were outlined by Charles Gordon, managing director, and W. V. Hill, manager California Electric Railway Association. Labert St. Clair told of the preparation of publicity material for the convention.

Brief comments on the status of the interstate bus bill and Interstate Commerce Commission railroad consolidation plan were made by Dr. Thomas Conway, speaking for the committee on national relations. Reports were received also from the policy, membership, finance and manufacturers advisory committees. W. E. Wood, chairman publications committee, outlined a plan by which it is proposed to increase the circulation of the association's magazine *Aera* and place it in the hands of a larger number of men in a supervisory capacity in the industry. After considerable discussion of various phases of this project it received the unanimous indorsement of the executive committee.

Preceding the meeting the members of the executive committee were the guests of Col. Joseph Alexander, president Cleveland Railway, at a luncheon at the Union Club. It was decided to hold the next meeting on March 21 at association headquarters, New York.

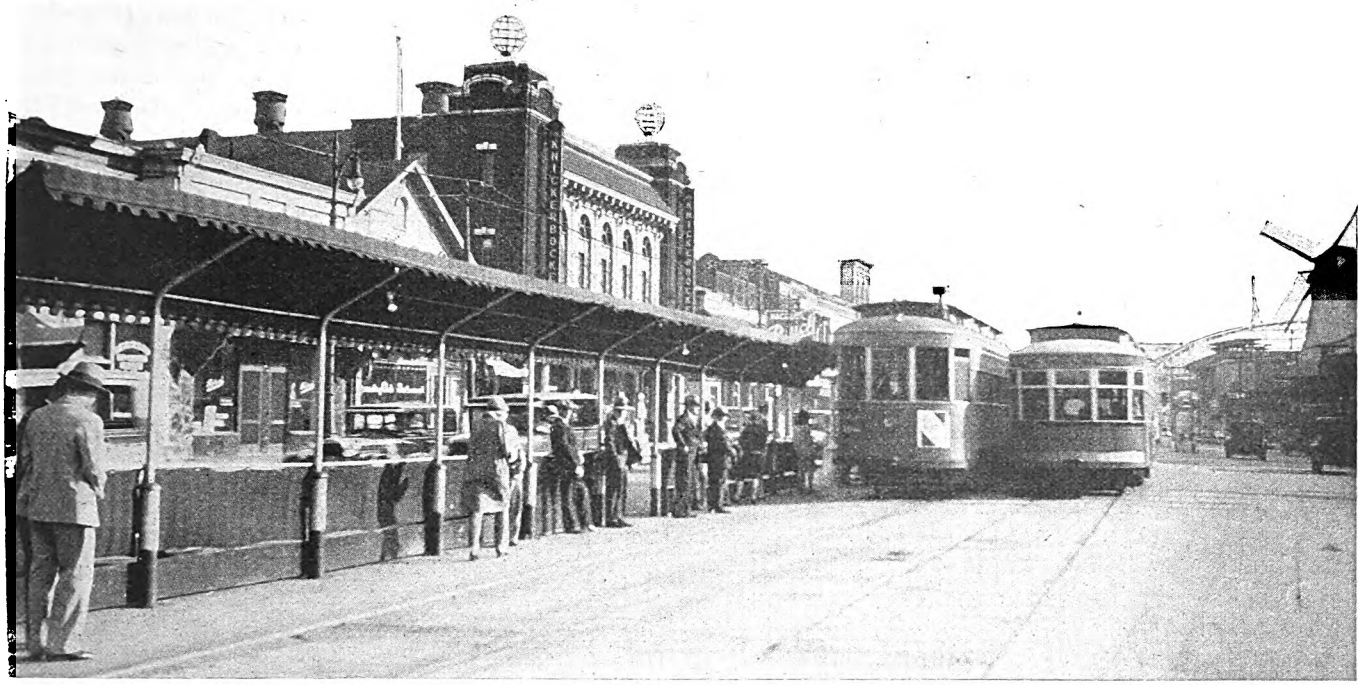
Anti-Freeze Liquid Changed

FREQUENT trouble has been experienced during the present winter due to freeze-ups in the air brake equipment on cars equipped with anti-freezers. This trouble first made its appearance the latter part of last winter and became more acute this year. The cause of the trouble has been traced to the alcohol used. From the chief chemist of the Prohibition Department, it has been learned that U. S. Formula No. 5, which is generally used in automobile radiators, was modified about two years ago, one of the modifications consisting of adding a small percentage of aldehol, which has a high boiling point. This makes Formula No. 5 a good anti-freeze solution for automobile radiators but has just the opposite effect in preventing freeze-ups in the air brake system of electric railway cars. For that reason it is recommended that U. S. Formula No. 1 should be used to prevent freeze-ups in air brake systems. In so doing it is necessary to clean the anti-freezers thoroughly, so as to insure that all the aldehol is removed.

Second Contest Period Starts

BEGINNING Feb. 1, the second period of the Electric Railway Journal Maintenance Contest will extend until April 30. Rules were published in the issue of November, 1929. Contributions will be welcomed from anyone in the industry. Watch for announcement next month of the prize winners for the first period.

Digitized by Google



Train on the Jefferson Avenue line approaching a station. The safety zones are covered with awnings and are well protected

Detroit Express Service

Gains Popularity

By

CLIFFORD A. FAUST

Assistant Editor *Electric Railway Journal*

Public well pleased with express street car service after 28 months of experience on one line and 17 months on a second. Passengers and revenue increase steadily on both lines. Fewer stops and higher speeds facilitate movement of all traffic

WHEN the Department of Street Railways, Detroit, inaugurated express street car service on Jefferson Avenue in September of 1927, using small buses for local service, the plan was looked on rather as an experiment. There were numerous skeptics who predicted a short life for the plan. But in spite of such prognostications, the express service became popular immediately after its introduction and became more so as the months passed.

The best evidence of the success of the Jefferson line was the adoption of a similar plan on Grand River Avenue on Aug. 19, 1928. Like the original installation, this line met with public favor at the very outset and attracted an increasing number of patrons as the people became acquainted with the system. In some measure the immediate acceptance of the Grand River express service was due to the education of the public by the Jefferson line, but by and large, it was occasioned by the higher speed and shorter running time.

Figures from the beginning of the service to the end of 1929 show clearly that the Jefferson Avenue line has enjoyed a very large increase in patronage and that the Grand River line also has built up its riding, in spite of the inauguration of a paralleling high-speed, de luxe bus route. Passenger revenue, as well, has shown corresponding increases on both lines. Measured by these two barometers, patronage and revenue, express service is a successful innovation in Detroit.

Moreover, there is an intangible factor which is reflected in these figures and which is extremely important from the standpoint of the Department of Street Railways. It is the good will obtained by offering an improved service. Aside from the evidence of good will appearing in the operating results, the management has received hundreds of letters, praising the new system and commending the railway for making the change. It is significant that many motorists have stated that they are

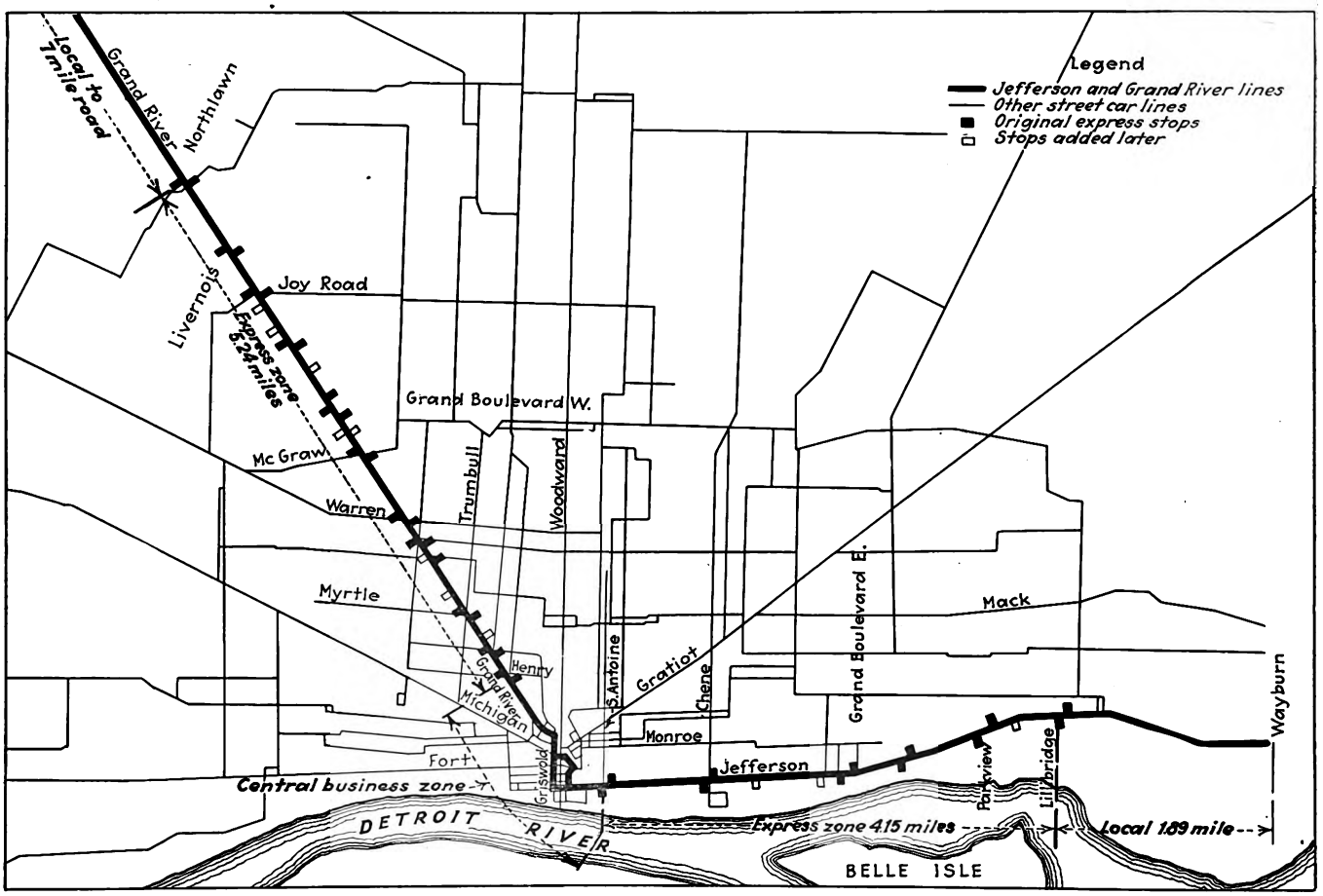
Digitized by Google

leaving their automobiles at home and riding the high-speed trolley lines to get to their places of employment more quickly and more pleasantly. Letters received from regular patrons have also praised the express service from the standpoint of saving time and making a more comfortable ride. Many expressed real pride in riding the lines because they can get to work in less time than neighbors driving automobiles.

Other Benefits of System

In addition to the important results of more passengers and revenue, and an increased amount of good will, the express service has brought about several others. consumption in kilowatt-hours per car-mile to be 2.65 and 2.43 in the express zone, as compared with 6.03 in the downtown loop and 4.08 in the local zone. These savings are very important, since the line is one of the heaviest traveled in the city.

It has been proved in Detroit that higher speeds of both street cars and buses are attended by fewer accidents. In an accompanying illustration are shown curves for average street car speed and number of accidents over a period of more than one year. As will be seen, the accidents decrease as the speed increases, and vice versa. Greater safety on the express lines may be attributed largely to the fewer loading areas in the street and the



On Jefferson Avenue express stops originally numbered six each way and averaged one every 0.83 mile. A few added more recently have decreased the spacing slightly. On Grand River Avenue there were originally eleven inbound and twelve outbound stops. Since the discontinuance of local bus service a few more stops have been added

Among these are lower operating expenses, a higher degree of safety, an increase in the street capacity, a speeding of all forms of traffic, and an improvement of public relations, largely by pleasing the motorists and truck drivers.

Operating expenses have been lowered principally through the saving of cars, operators and power. On the Jefferson Avenue line five cars are saved on the base schedule and twelve on the peak. On the Grand River line three cars are saved on the base and ten on the peak. On the individual cars and trains in express service there also is a large saving in energy over full local service because of the elimination of many stops. As shown in the accompanying chart two single cars on the Jefferson line average 2.15 and 2.07 kw.-hr. per car-mile in the express zone, but consumed 4.31 kw.-hr. in the downtown loop and 3.30 kw.-hr. in the local zone. Tests with two trains of a motor car and trailer each showed the energy greater protection of those at the express stops. Automobiles running through insufficiently guarded loading areas are responsible for a great number of accidents each year, so that elimination of stops is bound to reduce the accidents. The type of safety zones used at the express stops is shown in one of the views reproduced.

On Jefferson Avenue the local transfer buses are permitted to enter the safety zones, but no other vehicles. Passengers at points between the express stops are picked up at the curb, eliminating another hazard.

Conditions Affecting Auxiliary Coach Service

Combination express street car and local bus service is still given on the Jefferson Avenue line, but not on the Grand River Avenue line. Coach service was given for a time on the Grand River route, but suspended when it was found that only a few passengers availed themselves of the transfer privilege. Coincident with their

Digitized by Google

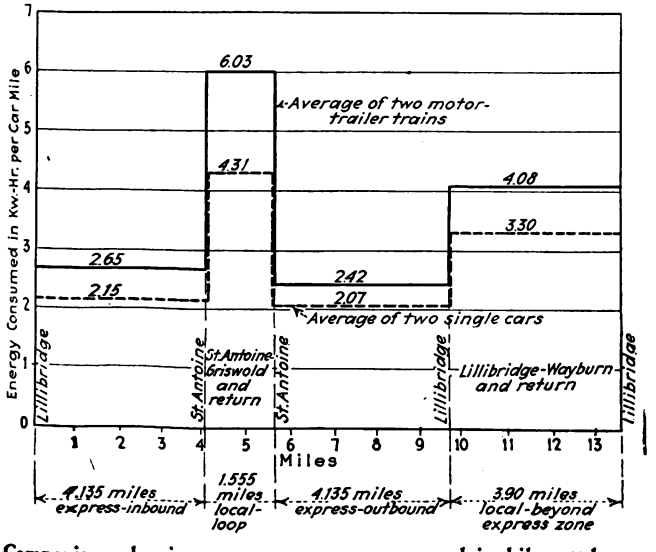
Table I—Revenue, Passengers and Speed of Jefferson Line, October, 1927, to December, 1929

	Rail			Coach		
1927	Revenue in Dollars	Revenue Passengers	Average Speed in M.P.H. including layovers including operation in local zones	Revenue in Dollars	Revenue Passengers	Average Speed in M.P.H.
October	63,460	1,033,179	12.15	14,343	236,992	.....
November	61,890	1,016,204	12.02	16,064	264,504	.....
December	66,005	1,083,147	11.00	19,069	313,752	.....
1928						
January	75,476	1,226,947	11.38	19,776	324,933	.....
February	73,378	1,193,822	11.53	19,753	324,826	9.88
March	82,057	1,339,562	11.79	21,888	359,703	.....
April	75,371	1,231,195	11.69	20,908	339,942	9.97
May	79,491	1,298,317	11.55	21,354	346,666	9.90
June	78,082	1,270,205	11.58	21,470	349,285	9.96
July	77,783	1,266,440	11.32	20,467	332,000	9.87
August	76,218	1,240,785	11.38	20,641	334,272	9.85
September	74,415	1,213,655	11.70	18,452	299,299	9.84
October	78,491	1,281,090	11.92	21,269	345,624	9.85
November	79,798	1,304,573	11.86	20,137	326,497	9.94
December	79,116	1,298,538	12.05	20,258	329,539	9.97
1929						
January	87,525	1,424,854	11.78	20,090	325,503	9.86
February	82,369	1,343,854	11.78	19,302	313,340	9.97
March	89,945	1,470,583	11.84	21,191	344,407	9.99
April	88,738	1,448,790	11.94	20,647	335,121	10.07
May	91,760	1,495,638	12.02	20,469	332,311	10.13
June	89,848	1,463,887	11.99	16,234	263,838	10.20
July	88,214	1,435,875	12.24	15,512	251,335	10.24
August	86,642	1,410,938	12.21	15,719	255,098	10.31
September	80,830	1,318,053	12.31	14,453	234,312	10.37
October	81,244	1,330,803	12.14	15,728	255,237	10.33
November	75,011	1,230,436	12.34	14,314	232,924	10.31
December	84,572	1,383,021	11.68	14,908	242,970	10.16

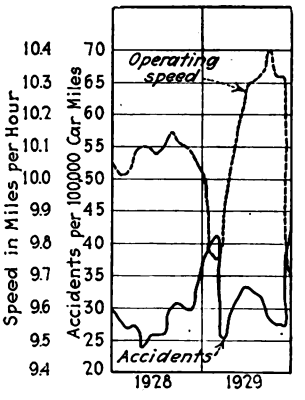
removal a few more stops were added to the street car line. From the very outset of the Jefferson Avenue line there were fewer transfers from local buses to express street cars and cars to buses than the company had expected. Patrons residing within a reasonable distance of the central business district preferred to remain on the local buses rather than make one or two changes. It also was discovered that people would walk a longer distance to an express street car stop rather than bother with taking a transfer bus. The service is maintained by the local buses on Jefferson Avenue now for those who do wish to make the changes and for those who prefer to ride the entire distance by bus.

Passengers Have Increased Steadily

In Table I are given the revenue, passengers and average speed of the Jefferson line for the months of October, 1927, to December, 1929, inclusive. Study



Comparison showing average energy consumed in kilowatt-hours per car-mile by two single cars and two trains of a motor car and trailer each on Jefferson line. Note the much lower consumption in the express zone



Accidents decrease as the speed of street cars increases in Detroit, and vice versa, according to the above curves

of this table shows that with the exception of one month — November, 1929 — both revenue and passengers have increased over the corresponding month of the previous year.

On the Grand River line both revenue and passengers for the street cars have increased, the month of November, 1929, being the only one to show a decrease over the corresponding month in the previous year. Revenue was built up from $102,313 in September, 1928, to $114,969 in December, 1929. Revenue passengers for the corresponding month totaled 1,672,508 and 1,879,760. Coach operation on Grand River Avenue for the period of a little more than five months showed an increase for the first three months and a sharp falling off for the last two. These figures are given in Table II.

Division of revenue and passengers for a typical day early in 1929 on the Jefferson express line is made in Table III. For both railway and coach operation the greatest amount of revenue was collected in cash fares, tickets accounting for a greater portion of the remaining revenue. The ratio of the total railway revenue to coach revenue was approximately 4 to 1. However, the mileage of the street cars was less than 2½ times that of the coaches. Receipts per vehicle-mile for the cars were $0.404 and $0.256 for the coaches; passengers per

Table II—Revenue, Passengers and Speed of Grand River Line, September, 1928, to December, 1929

	Rail			Coach		
1927	Revenue in Dollars	Revenue Passengers	Average Speed in M.P.H.	Revenue in Dollars	Revenue Passengers	Average Speed in M.P.H.
September	102,313	1,672,508	11.22	4,912	80,084	9.20
October	113,491	1,854,708	10.77	8,073	130,269	9.76
November	116,203	1,905,170	10.95	10,051	165,206	10.18
December	112,580	1,844,354	10.98	9,336	149,684	10.06
1929						
January	117,193	1,912,535	10.76	5,557	87,862	9.93
	Rail Only					
February	115,274	1,882,987	10.64			
March	125,247	2,045,846	10.87			
April	118,637	1,936,012	10.94			
May	118,104	1,926,714	11.10			
June	110,419	1,799,182	11.23			
July	103,421	1,682,727	11.45			
August	102,934	1,675,313	11.83			
September	104,014	1,696,441	11.63			
October	114,500	1,872,743	11.50			
November	107,583	1,760,567	11.53			
December	114,969	1,879,760	10.85			

Table III—Analysis of Jefferson Express Line on a Typical Day, March 1, 1929

	Railway	Coach
Revenue:		
Cash	$1,588	$477
Tickets	1,392	320
Transfers	155	50
Total	$3,135	$847
Mileage:		
Mileage	7,763	3,302
Receipts per vehicle-mile	$0.404	$0.256
Passengers per vehicle-mile	9.489	5.440
Passengers:		
6-cent passengers	26,461	7,788
Ticket passengers	25,056	5,762
10-cent passengers	.....	94
Jefferson line transfers	1,098	1,476
Other transfers	21,046	2,842
Total	73,661	17,962

Digitized by Google

Table IV—Detailed Analysis of Grand River Express Operation—Daily Averages of Data for the Weeks from August 20-24 to November 26-30, 1928

Daily Averages For Street Cars	Aug. 20–24	Aug. 27–31	Sept. 4–7	Sept. 10–14	Sept. 17–21	Sept. 24–28	Oct. 1–5	Oct. 8–12	Oct. 15–19	Oct. 22–26	Oct. 29–Nov. 2	Nov. 5–9	Nov. 12–16	Nov. 19–23	Nov. 26–30
Car-miles	9,806	9,944	10,545	10,632	10,832	11,200	11,202	11,202	11,201	11,337	13,286	13,479	13,910	13,617	14,055
Total revenue	$3,404	$3,509	$3,865	$3,626	$3,803	$3,943	$3,884	$3,799	$3,797	$4,007	$4,195	$4,099	$4,106	$4,054	$4,245
Total operating expenses	$2,999	$3,064	$3,178	$3,097	$3,005	$3,198	$3,208	$3,263	$3,309	$3,365	$3,823	$3,775	$3,809	$3,671	$3,828
Net revenue	$405	$445	$687	$529	$798	$745	$676	$536	$488	$642	$372	$324	$297	$383	$417
Revenue per car-mile, dollars	$0.3471	$0.3529	$0.3665	$0.3411	$0.3511	$0.3521	$0.3467	$0.3391	$0.3384	$0.3535	$0.3158	$0.3041	$0.2952	$0.2978	$0.3002
Revenue passengers	55,485	57,272	63250	59,253	62,196	64,445	63,458	61,950	62,204	65,420	68,525	67,240	67,349	66,602	69,455
Transfer passengers	23,470	23,659	24,967	24,404	24,752	23,962	24,618	24,638	24,045	25,319	25,165	26,855	26,348	25,756	26,043
Total passengers	78,955	80,931	88,217	83,657	86,948	88,407	88,076	86,588	86,249	90,739	93,690	94,095	93,697	92,358	95,498
Speed in miles per hour	11.22	11.43	11.69	11.79	11.88	11.98	1.182	11.41	11.25	11.23	10.78	11.22	11.65	11.63	11.62
Combined Car and Coach															
Net revenue—cars	$405	$445	$687	$529	$798	$745	$676	$536	$488	$642	$372	$324	$297	$383	$417
Net revenue—coaches	*$406	*$197	*$154	*$89	*$75	*$85	*$80	*$77	*$92	*$77	*$122	*$109	*$117	*$70	*$76
Net revenue cars and coaches	*$1	$248	$533	$440	$723	$660	$596	$459	$396	$565	$250	$215	$180	$313	$341

*Deficit.

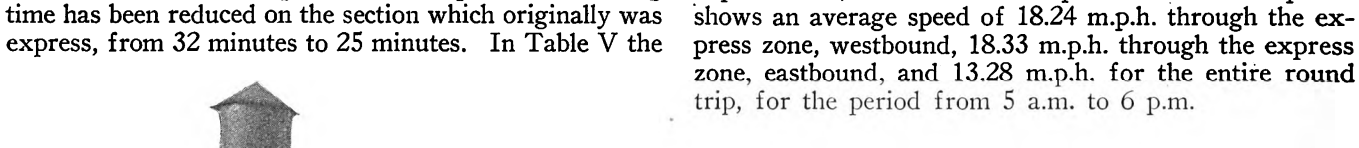
vehicle-mile were 9.489 for the cars and 5.44 for the coaches. Of the 73,661 total railway passengers, 26,461 paid 6-cent fares, 25,056 tendered tickets, 1,098 transferred from Jefferson Avenue coaches and 21,046 transferred from other lines. Of the 17,962 coach passengers, 7.788 paid 6-cent fares, 94 paid 10-cent fares, 5,762 used tickets, 1,476 transferred from the express cars and 2,842 transferred from other lines.

A detailed analysis of the Grand River express operation for the weeks from Aug. 20-24 to Nov. 26-30, 1928, is given in Table IV.

On the Jefferson Avenue line the speed before express operation was started was 12.45 m.p.h.; the speed in the express zone is now 18.4 m.p.h. The running time, which formerly was 20.5 minutes through the express zone of 4.15 miles, has been reduced to 13.5 minutes. On the Grand River line the average speed was increased from 12.15 m.p.h. to 17.36 m.p.h. The running time has been reduced on the section which originally was express, from 32 minutes to 25 minutes. In Table V the running times and average speeds of the Jefferson line for three periods of a typical day in 1928 are given. The speeds are calculated for the outlying local zone, the express zone, the downtown loop and the round trip. It shows an average speed of 18.24 m.p.h. through the express zone, westbound, 18.33 m.p.h. through the express zone, eastbound, and 13.28 m.p.h. for the entire round trip, for the period from 5 a.m. to 6 p.m.

Table V—Running Time and Average Speed of the Jefferson Line, as Operated, on a Typical Day in 1928

	Westbound				Eastbound			
	Local Zone 1.89 Miles	Express Zone 4.15 Miles	Total for Both Zones 6.04 Miles	Downtown Loop 1.55 Miles	Express Zone 4.15 Miles	Local Zone 1.89 Miles	Total for Both Zones 6.04 Miles	Round Trip from Easterly Terminus 13.63 Miles
5:00 a.m.-8:30 a.m. time in min. and sec.	10:54	14:15	25:09	13:48	13:20	9:32	22:52	61:49
Speed in m.p.h.	10.39	17.47	14.41	6.74	18.68	11.90	15.83	13.22
8:00 a.m.-3:30 p.m. time	9:34	12:38	22:12	15:00	13:26	8:50	22:16	59:28
Speed	11.86	19.70	16.31	6.20	18.53	12.83	16.26	13.75
3:30 p.m.-6:00 p.m. time	11:35	13:57	25:32	16:07	14:27	9:44	24:11	65:50
Speed	9.79	17.87	14.18	5.78	17.24	11.64	14.98	12.42
5:00 a.m.-6:00 p.m. time	10:29	13:39	24:08	14:43	13:35	9:11	22:46	61:37
Speed	10.82	18.24	15.01	6.32	18.33	12.34	15.91	13.28



On Jefferson Avenue the local transfer buses run inside the safety zones at express stops. Between these stations they stop at the curb

Digitized by Google

More Business and How to Get It

Ways of securing additional traffic were theme of annual meeting of Central Electric Railway Association held at Cleveland Jan. 23-24. Other topics of interest were technique of freight handling and employee training

RECOGNITION of the importance of freight business as a source of revenue for the interurbans was a notable feature of the annual meeting of the Central Electric Railway Association, held at Cleveland, Ohio, Jan. 23 and 24. One entire session was devoted to a discussion of means of developing this type of business. Development of passenger business was touched upon by speakers at other sessions.

"Were it not for the freight traffic now carried by the interurbans, and the promising outlook for the continued development of freight business, the future of the interurban industry would indeed be problematical," said William L. Butler, executive vice-president Cincinnati & Lake Erie Railroad. "Success in holding and developing freight business depends upon our ability to give overnight delivery to an ever-widening territory, and upon the enterprise and ingenuity in supplementing our rail service to provide the same or greater convenience, reliability and cheapness of service for prospective shippers as is afforded by our principal competitor, the motor truck, or by the steam railroads."

The speaker also made a point of the necessity of developing an entirely new technique of freight service by the electric railways if they are to hold a position in the transportation industry midway between the steam railway and the motor truck. "Not only must we move freight more quickly, but we must modernize our facilities and operations to move it more economically," said Mr. Butler.

"Much depends upon the development of a closer contact between the company and the shipper," declared H. A. Nicholl, general manager Union Traction Company of Indiana. He expressed the opinion that a great deal can be accomplished in this direction by cutting down the loss and damage of shipments and by effecting quicker settlements where losses are sustained. "Companies are to some extent going into the pick-up and delivery business," stated Mr. Nicholl, and he urged a further extension of this activity, calling his hearer's attention to the clear-cut recommendation of their own committee on the subject made at a previous meeting.

"Don't let your interurban suffer," advised C. L. Van Aucken, editor *Electric Traction,* in a paper on "Interurban Development." "Either kill it or cure it." Citing numerous examples of what had been done in the C.E.R.A. territory the speaker affirmed his faith in the belief that in the majority of cases, if energetic methods are employed, a cure can be effected.

That too many railways have plowed along the same old furrow until it has become a rut was the opinion expressed by Hudson Biery, Cincinnati Street Railway, whose paper on "City Transportation Development" was read by Paul Wilson. "Many of us are trying to render adequate service rather than attractive service," he stated. In discussing the matter of advertising the speaker advised that it should start with a limited program and expand gradually, but, once started, the program should never be allowed to die out entirely.

The program was concluded by a showing of stereopticon slides illustrating methods of handling freight in the C.E.R.A. territory. The showing of the pictures was accompanied by a discussion of the subject by J. K. Coberly, traffic manager of the Columbus, Marion & Delaware Railway.

Fundamental factors affecting the present situation and the future of the electric railway industry were discussed at the opening session. Following a brief address of welcome made by John D. Marshall, Mayor of Cleveland, L. M. Brown, president of the association, presented an encouraging picture of what the future will hold for the industry if it takes advantage of its opportunities. An abstract of his remarks appears elsewhere in this issue.

Charles Gordon, managing director of the American Electric Railway Association, pointed out the necessity of approaching our work with the aim of solving the community transportation problem rather than merely trying to operate electric cars. Since the earliest day when electricity was first used as a source of power, it has never yet been relegated to a secondary position in any field and it is not likely, according to Mr. Gordon, that electricity will suffer defeat in the field of local transportation.

Movement of people, not movement of vehicles, is the ultimate objective, he said. One four-track rapid transit line will carry as many people as 25 express highways. One double-track street car line will carry four times as many people as an express highway. More than 200 years ago, the streets of London were congested because too many people used private transportation vehicles. That was the origin of the first public transportation service. To return now to the use of private vehicles would be a step backward. Intelligent development of public transportation facilities is the only possible solution of the problem.

How public transportation service is being given in Grand Rapids was the subject of a paper by L. J. De

Digitized by Google

Lamarter, general manager Grand Rapids Railroad, which in the absence of Mr. De Lamarter was read by J. W. Knecht. It was brought out in this paper that modern cars in Grand Rapids have not only decreased operating cost but also attracted new riding.

Selling methods were discussed by E. S. Jordan, Jordan Motor Car Company, who spoke at the morning session on the second day of the meeting. "The great American novel, when it is written, will be written around the story of transportation and communication," he said. "It is a dramatic, romantic business in which we are engaged." The speaker pointed out that civilization is based upon the lowest cost per ton-mile of transportation, and cited numerous examples in the history of transportation to prove his theory.

In a comprehensive and instructive paper on "The Conference Method and Its Use in the Training of Employees," E. G. Cox, director of service improvement, Chicago, North Shore & Milwaukee Railroad, told of the development of the conference training methods with particular reference to the manner in which it was applied on the property which he represented. Dividing his paper into four general parts he discussed, in turn, what the conference method is, why it is used, how it operates, and what it accomplishes.

"Contrary to the accepted thoughts of a few years ago," said the speaker, "the important period of training the employees does not end with the close of the probation period. The vestibule instruction of a new man, although highly important, is not now regarded as the beginning and the end of the training period. Rather the training process goes on and on as long as the service of the employee, and the longer it goes on the more difficult it is likely to become."

The meeting was closed with the report of a number of committees, followed by the election of officers. Officers for the coming year will be:

President, L. G. Tighe, assistant general manager Northern Ohio Power & Light Company, Akron, Ohio.

First Vice-President, F. H. Wilson, president and general manager Cleveland Southwestern Railway & Light Company, Cleveland, Ohio.

Second Vice-President, R. R. Smith, receiver Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.

Secretary-Treasurer, L. E. Earlywine, Central Electric Railway Association, 308 Traction Terminal Building, Indianapolis, Ind.

Henry Bucher, general manager Indiana Service Corporation, Fort Wayne, Ind., was elected to the executive committee to replace C. T. Dehore, president Indianapolis & Southeastern Railroad, Indianapolis, Ind.

The Dodo Became Extinct Because It Ceased Developing*

By L. M. Brown

Vice-President Interstate Public Service Company
President Central Electric Railway Association

SOME people would have us believe that electric railway men are in the same class as the dodo bird. The dodo bird is extinct and today there are those who voice the opinion that we are rapidly approaching extinction and it is only a matter of time until we will be hunting jobs in other lines of business. While it is unquestionably true that the number of electric railways is gradually diminishing, this does not necessarily mean the general breakdown of such transportation as a means of handling urban and interurban traffic. Rather do we see in the gradually diminishing mileage of electric railway lines a possible solution to the difficulties that admittedly beset our path.

Perhaps there is some justification in likening those lines that fail to the once proud and plumed dodo bird. The dodo became extinct because it quit growing and developing with the changing times. Rather than follow the example of the other birds that tried hard to meet new climatic and food conditions, it allowed its feathers to droop and it sulked. The results were just those which might have been foreseen. But the fact that the dodo bird died out had little or no connection with development of other birds which found themselves facing the same conditions. The latter are still doing business and raising large and prosperous families.

The trends in our industry today are twofold. First, there is consolidation into logical, contiguous and larger systems, and second there is a gradual elimination of those lines foredoomed to failure long ago when they were constructed from "nowhere to nowhere" with no stopover privileges. These latter lines had the seed of their failure in their inception, for they were built quite largely in what may be termed a "boom" period, when the idea held sway that any kind of a line would pay if it could only be built.

The process of elimination of these lines is a healthy and normal situation. We do not despair of a tree when we prune its weaker branches, but on the contrary are more optimistic as to its ultimate success. It is thus that we see the gradual elimination of various lines an omen for good rather than otherwise and we take increased courage for the future.

To be successful we dare not stand still. Many of the major units in our territory are definitely committed to a policy of consolidation, admittedly in an effort to place various lines that are now financially unsuccessful upon a successful basis. With unified management and operation backed by adequate finances the public will benefit by improved service.

It is evident that the freight business must contribute an increased proportion of interurban line revenue. For these lines to prosper they must increase this business, and particularly the carload business. To do this successfully will require improved terminal facilities, industrial sidings, elimination of short radius curves, building around some cities and towns, and other improvements in roadway and equipment for faster and more economical operation.

To meet the growing demand for fast, comfortable and convenient passenger service on both city and interurban lines, large sums of money have been and are now being spent to rehabilitate a number of properties in this territory. Modern, light-weight, easily running, noiseless cars for one-man operation, with comfortable seats and attractive appointments, and the speeding up of the service improves the morale of the public and employees and tends to increase the riding habit. In some of the larger cities serious consideration is being given to underground rapid transit or other forms of rapid transit lines on private right-of-way; to the operation of de luxe motor coach service in appropriate territory at possibly higher rates; and to the taking over of taxicab service. Some of these plans are as yet in the experimental stage and it is too early to know just what the final results may mean, but the efforts now being put forth certainly make the outlook for the industry much more encouraging.

Let us not be discouraged by a seeming apathy and lack of appreciation on the part of the public. Service and conveniences are frequently unappreciated until they are lost, or drastic events bring them to the attention of those who use them. The public may, occasionally, find something new in which it will become interested for a time, but experience will, in time, force that same public back to the patronage of a business based upon sound economic principles.

Our task is to adapt the type of transportation we represent to a civilization that is constantly increasing in wealth and in complexity. The opportunity is before us. The public needs and should have modern, efficient electrical transportation. It is within our province to supply that need, and if we do so our efforts will be appropriately rewarded.

**Abstract of an address made at the annual meeting of the Central Electric Railway Association, Cleveland, Ohio, Jan. 23-24.*

Digitized by Google

Opportunities for Profits in

De Luxe Bus Operation

Survey of urban de luxe bus operations by more than a dozen railways shows that exclusive, higher fare service attracts new riders, principally from the automobile and not gained at the expense of the street car and city-type bus

By
J. R. STAUFFER
Assistant Editor *Electric Railway Journal*

THAT the de luxe bus attracts new riders, produces additional income without a sacrifice on the part of city-type operations and is a type of vehicle capable of gaining favor on routes through many highly restricted residential districts of a city, has been definitely proved by the experience of a number of leading electric railways.

Co-ordination of street car and trolley-fare bus services has progressed steadily during the past decade, with the result that many companies have definitely strengthened their operating and economic structures. However, there is an additional definite field for the de luxe bus and the faster, more exclusive features it affords. This field is not limited exclusively to the development of new sections, but often is to be found along or parallel to existing city routes. Although one of the major values of the de luxe bus is the part it has played in securing franchises through districts where formerly any suggestion of public conveyance met with wholesale opposition, it has been equally well applied to established arteries of mass transportation.

Operating practices in Pittsburgh and Detroit contrast these applications very clearly. In Pittsburgh, six 25-cent fare de luxe coach routes originate in the heart of the downtown business district, extend along improved motor boulevards and serve, on their outbound extremities, the most exclusive residential sections of the city or suburbs. In Detroit, four 10-cent minimum-fare parlor coach lines have been established and successfully operated on four main thoroughfares, served throughout their length by street cars or city-type buses at lower fares. In both cities patronage has been built up from those persons who rarely used the regular service, but were attracted by the new, distinctive vehicles and the advantages of the service they rendered.

"De luxe," the word itself and its application to bus equipment and the type of service rendered, is unquestionably a relative term and any general definition must be the result of past and present practices. Those companies that are utilizing the de luxe bus have almost unanimously had one objective in establishing such service, namely, a form of transportation to bridge the gap between the street car and the higher priced means of

Digitized by Google

Comparative Study of Fourteen DeLuxe Bus Routes

Company	Line	One Way Mileage	Equipment Used	Territory Served	Other Forms of Transportation in Territory Served	Fare	Fare on Street Car or City-Type Bus	Headways, Minutes		Speed, M.p.h.	Speed of City-Type Service	Standees
								Peak	Base			
Pittsburgh Railways Pittsburgh, Pa.	Wilkinsburg	7.57	Twin Coaches 35 passenger	Business district of Pittsburgh and residential sections	Street car and trains	25c. 9 tickets $2.00	3tokens 25c.	4	10	13.80	10.09	Yes
	Highland Park	7.47	Yellow Coaches 19 passenger	Pittsburgh and East Liberty business and residential districts	Street car	25c. 9 tickets $2.00	3tokens 25c.	7	15	14.00	10.28	Yes
	East Liberty	5.12	Yellow Coaches 29 passenger	Pittsburgh and East Liberty business and residential districts	Street car and trains	25c. 9 tickets $2.00	3tokens 25c.	4	7	13.90	10.2	Yes
	Squirrel Hill	5.72	Yellow Coaches 19 passenger	Downtown Pittsburgh and exclusive residential section	Street car	25c. 9 tickets $2.00	3tokens 25c.	5	10	15.60	11.13	Yes
	Mt. Lebanon	6.92	Yellow Coaches 21 passenger	Downtown Pittsburgh and residential districts	Street car	25c. 9 tickets $2.00	3tokens 25c.	5	12	18.00	11.85	Yes
	Bellevue	6.55	Yellow Coaches 19 passenger	Downtown Pittsburgh and residential districts	Street car and trains	25c. 9 tickets $2.00	3tokens 25c.	8	15	17.10	11.22	Yes
Dept. of Street Railways Detroit, Mich.	Grand River	12.18	44 Cadillacs 16 passenger	Business and residential districts	Express street car	10c. minimum (zones)	6c.	1½	3	14.10	11.43	No
	Jefferson	6.80	13 Dodges 15 passenger	Business, industrial and residential districts	Express, street car and city-type bus	10c. minimum (zones)	6c.	4	8	14.82	Exp.street car 14.82 bus 12.60	No
	Mack	9.07	13 Dodges 15 passenger	Business and residential districts	Express, street car and city-type bus	10c. minimum (zones)	6c.	4	10	15.46	11.18	No
	Woodward	8.08	81 Dodges 15 passenger	Business and residential districts	Street car	10c. minimum (zones)	6c.	1	2	14.36	10.39	No
Capital Traction Co. Washington, D. C.	Chevy Chase	8.00	16 Yellow Coaches 29 passenger type converted to 21 passenger capacity	Government administration, business and residential districts	Street car	25c.	6tokens 40c.	3 to 7	20	13.00	9.00	No
Cleveland Railway Cleveland, Ohio	Airport Express	12.85	4 cylinder Whites	Downtown Cleveland through residential district to airport	Street car and city-type bus	15c. to 25c. (zones)	Street car, 7c. Bus 10c.	30	60	17.00	15.00	Yes
	Heights Express	7.92	9 Yellow Coaches 29 passenger	Downtown Cleveland to exclusive Cleveland Heights	Street car and city-type bus	25c.	Street car, 7c. Bus 10c.	5	30	17.00	15.00	No
United Railways & Electric Co. Baltimore, Md.	Roland Park	6.25	7 Whites 25 passenger	Business District of Baltimore and residential sections of Roland Park, Guilford and Homeland	Street car and city type bus	25c.	4tokens 35c.	10	20	13.20	10.40	No

travel such as is afforded by the private automobile or taxicab. It was evident that it would be folly to establish lines of a superior type of service at equal or little higher fares than those being charged on the street car, because any patronage would be gained at the expense of the city type service. A new rider had to be found and the logical place was in that group of people who had previously left the street car for the automobile. It has generally been found that de luxe bus routes equipped with the most modern type of vehicles do appeal to a class willing to pay a higher fare for a service which is fast, comfortable and convenient.

Bus operations in Pittsburgh are unique in contrast with the general practices carried on by the other electric railways throughout the country. There is not one trolley-fare bus in regular use on a system of 592 miles of track. This is due, first, to the general topography of the territory served by the Pittsburgh Railways and, second, to the fact that this whole territory is adequately served by the street car. Consequently when the subject of bus operation presented itself the question of the type of service to be installed had to be considered from three angles: Should buses be substituted for street cars on a number of lines? Should co-ordinated service at trolley fare be established in direct competition with the street car? Should an additional higher fare service be placed on selected routes throughout the city? The latter course seemed the only logical one for the Pittsburgh property, and as a result the Pittsburgh Motor Coach Company now operates six de luxe coach lines at a 25-cent fare. In addition there are four zone routes at 25-cent minimum fare with additional 5-cent zones between Pittsburgh and Charleroi, Pittsburgh and Castle Shannon, Pittsburgh and Oakmont, and a line known as Frankstown Road. There is still a third type of service, namely, two routes at 10-cent minimum fare with 5-cent additional zones. These routes extend between Charleroi and California and Charleroi and Donora, Pa.

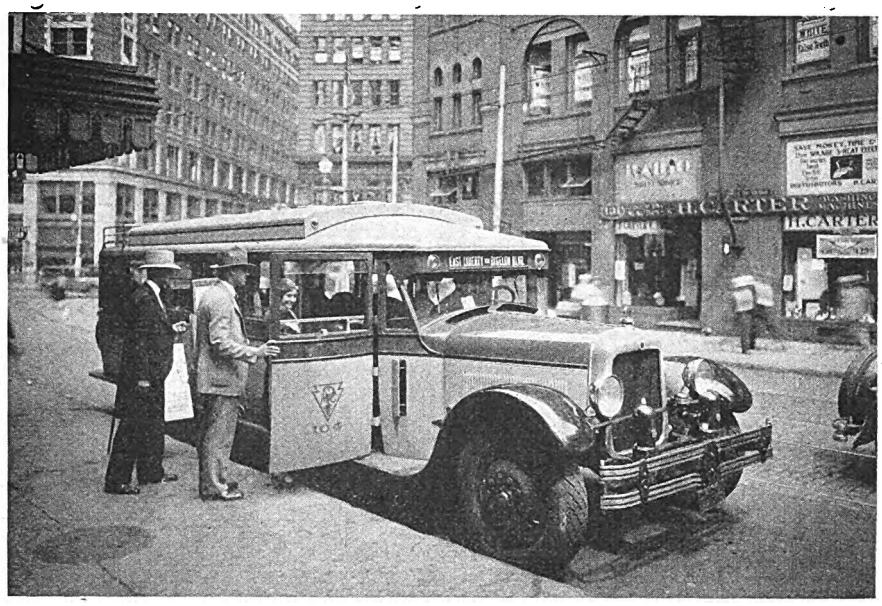
A careful analysis of the cost of travel in Pittsburgh was made. It was found that one could travel on the street car for approximately ½ cent per mile, could drive his privately owned automobile for about 10 cents per mile, or could use

A second article showing the use of the de luxe bus in interurban and interstate service will appear in a later issue.

Digitized by Google

the taxicab at approximately 20 cents per mile. It became evident that any means of transportation costing the rider about 3 cents a mile should be profitable, principally because the riders would not come from those who patronize the street car, and for 3 cents a mile a service of quality could be rendered to appeal to the rider who had left the street car previously for the automobile. A charge of 25 cents was made and has proved satisfactory for the lines established. Most of the riding on the Pittsburgh lines is one way, although on the new Wilkinsburg route there is now some two-way business. Nearly all passengers are carried for a greater part of the run. There is no short-haul traffic.

The Pittsburgh Railways began its operation with the larger type of bus, having seating capacities of from 29 to 35 passengers. Experience, however, on routes such as it operates with almost entirely one-way traffic has shown that the smaller type of bus is more satisfactory for this kind of work, and the company's new purchases are of the 21-passenger seating capacity.



In Pittsburgh de luxe bus terminals are centrally located in downtown business districts

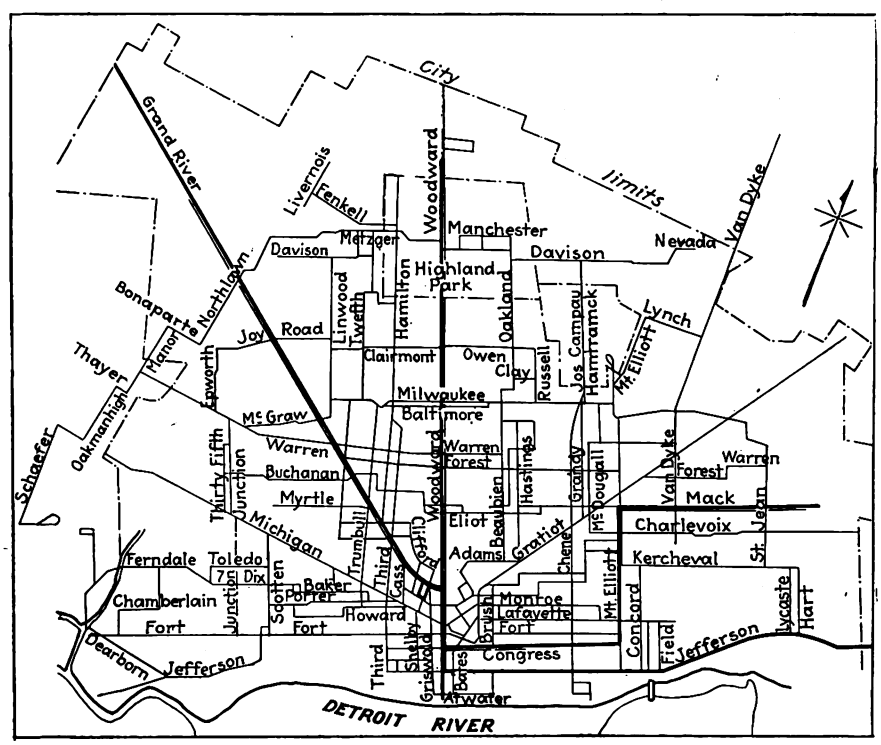
Detroit Operation Unique in Extensive Use of Smaller Buses

Unlike Pittsburgh, Detroit found its field for de luxe bus operation on four main thoroughfares served throughout their length with street cars and city type buses. Also operating on these routes were hundreds of jitneys carrying on an enormous business in competition with the railway's services. The small type bus was selected to replace jitneys principally because they created an impression of a more individual service than the larger equipment and because shorter headways could be run with fewer empty seats.

The four routes operated on Grand River, Jefferson, Mack and Woodward Avenues now use 161 buses of 15- and 16-passenger capacity of the Dodge and Cadillac manufacture. On the Grand River Line 44 16-passenger eight-cylinder Cadillacs are used to provide selective local service in co-ordination with an express street car route on this avenue. The fare on this line ranges from 10 cents to 30 cents, in 5-cent increments. The fare on the street car is 6 cents. The headways range from 1½ minutes in the peak hours with a base table of three minutes in the non-rush hours.

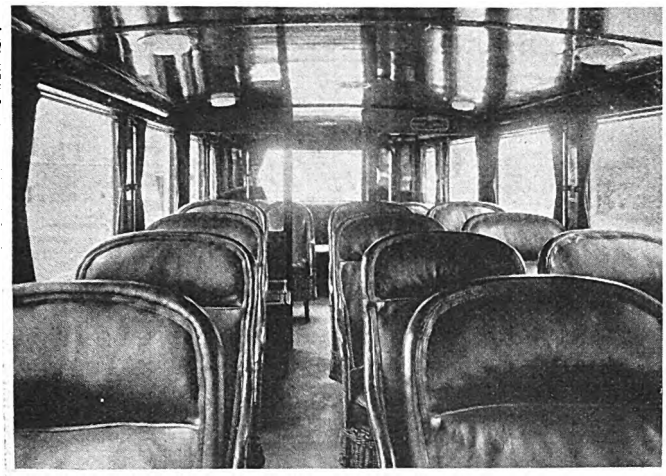
Likewise on Jefferson Avenue the de luxe bus operation has competition by express street car, local city-type bus and competitive bus service. The fares on this line range from 10 cents to 20 cents in 5-cent increments, while the street car and local bus charge 6 cents and the competitive bus 10 cents. This line serves the downtown section of Detroit as well as industrial and residential sections on Jefferson Avenue.

Woodward Avenue, one of the most heavily traveled thoroughfares in Detroit, is served by the Woodward Parlor Coach Line and a street car line. On this line eighty-one 15-passenger Dodges are used and run on one- and two-minute headways throughout the day. Short headways are also maintained by the street cars and yet at times there is apparently not enough service to accommodate the traffic on this avenue. From a revenue standpoint the de luxe bus operation on Woodward Avenue is the most successful. The Mack Avenue Coach Line operates parallel to the Jefferson coach route part of the way, then it turns north into residential districts. This



De luxe buses give selective service on four main arteries in Detroit

Digitized by Google



Unusual seating arrangement and smoking compartment feature the Chevy Chase buses

line operates thirteen 15-passenger Dodges at a fare of 10 cents to 25 cents in 5-cent increments. Headways of four minutes in the rush hours and ten minutes in the non-rush hours are scheduled.

The Capital Traction Company Washington D. C., operates three lines with de luxe bus equipment. The original one, the Chevy Chase coach line, was started in September, 1925, and operates from the downtown business section of Washington past the Union Station and Capitol to the outlying district of Chevy Chase. The second line is a sightseeing line purely and operates from the Treasury Building in the center of the city, past the Lincoln Memorial and through Potomac Park. Its operation is not comparable with the others except that the rate of fare and type of equipment used are the same. This line operates only during the summer months and caters principally to tourists. The third line, known as the Cleveland Park Parlor Car Line, was started in November, 1927, but as it did not prove profitable was abandoned on Sept. 30, 1929, with the exception of one trip in each direction in the morning and afternoon rush hours.

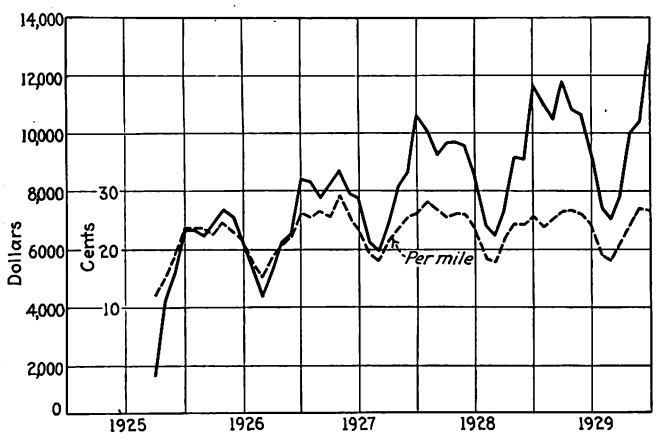
The Chevy Chase Coach Line has been a most successful operation since its beginning. It started operating with four buses on a headway of twenty minutes all day. Traffic has increased continually so that now sixteen coaches are used to run headways of three, four and five minutes in the morning and five, seven and ten minutes in the evening rush hours. An interesting chart showing the gross revenue and revenue per mile of this line, since its beginning, accompanies this survey. This increase in patronage has not been built up at the expense of the street car or city-type bus, but has come from new riders who prefer to leave their automobiles at home and use the high type of service that this line affords. The Chevy Chase Line parallels the street car line along its whole length outside of the city proper, and furnishes service which can be obtained on street cars throughout its length.

A distinctive feature of this line is the unusual seating arrangement of the bus. Twenty-nine-passenger Yellow Coach chassis are used, but individual seats are so placed that only 21 passengers are carried. From an economic standpoint this practice has been questioned, but those in charge of the Chevy Chase Coach Line feel sure that to a great extent this individual seating of their passengers without crowding has been the cause of its success. Another feature is the smoking compartment in the rear, partitioned off from the front of the bus by glass panels.

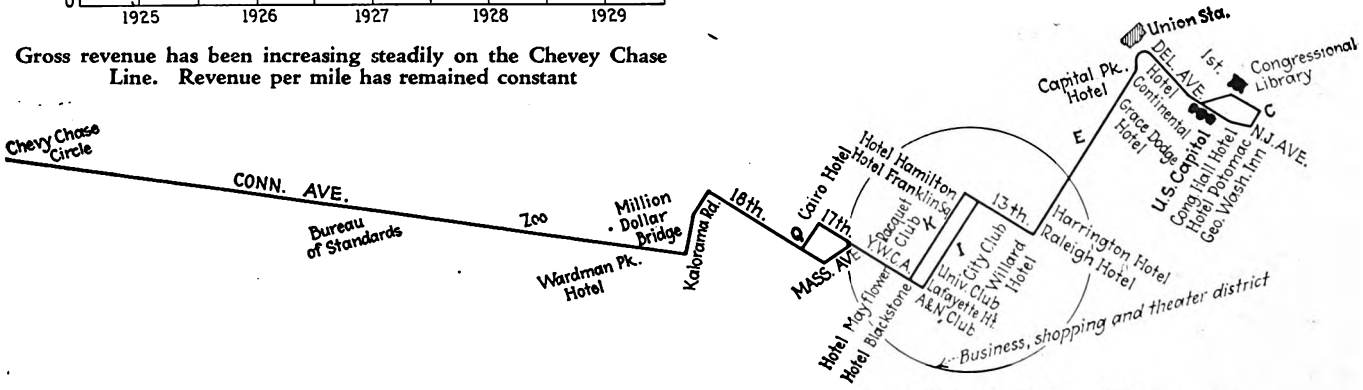
Cleveland Railway Operates Two Lines

Two express de luxe bus routes are operated by the Cleveland Railways in the territory which it serves. The first is known as the Airport Express; the second, the Heights Express. The latter line was only put in operation on Dec. 7, 1929, and is in every sense a full de luxe service between downtown Cleveland and the very highly restricted residential section of Cleveland Heights. The fare on this line is 25 cents. No transfers are given or accepted. Its installation just before the Christmas rush period had distinct advantages, in that a number of people used the line in preference to taking their automobiles into the Christmas traffic jams, became familiar with the type of service and are continuing to use it.

The line carried 380 customers the first day. This increased regularly until it now has over 800 fares a day. At the beginning a fifteen-minute service was provided during the rush hours. It was found necessary to give a ten-minute service during the rush hours on

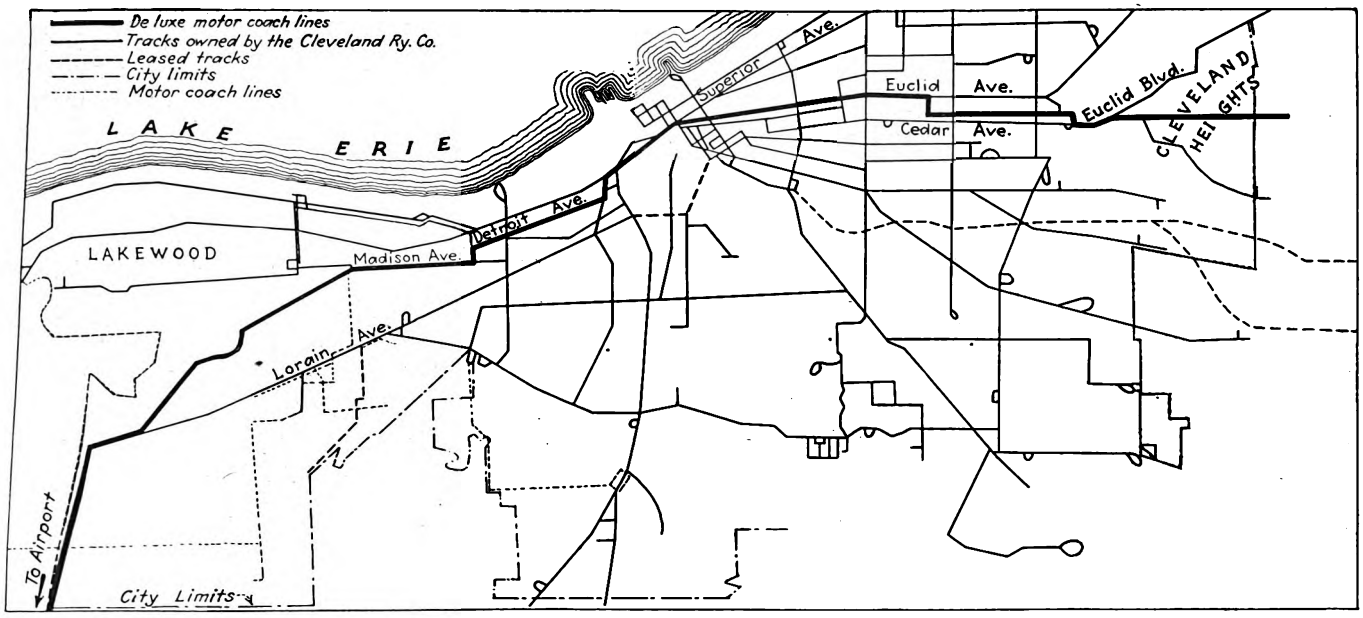


Gross revenue has been increasing steadily on the Chevey Chase Line. Revenue per mile has remained constant



The Chevy Chase Coach Line in Washington, D. C., serves all phases of the Capital's activities

Digitized by Google



Cleveland Railway operates two de luxe routes

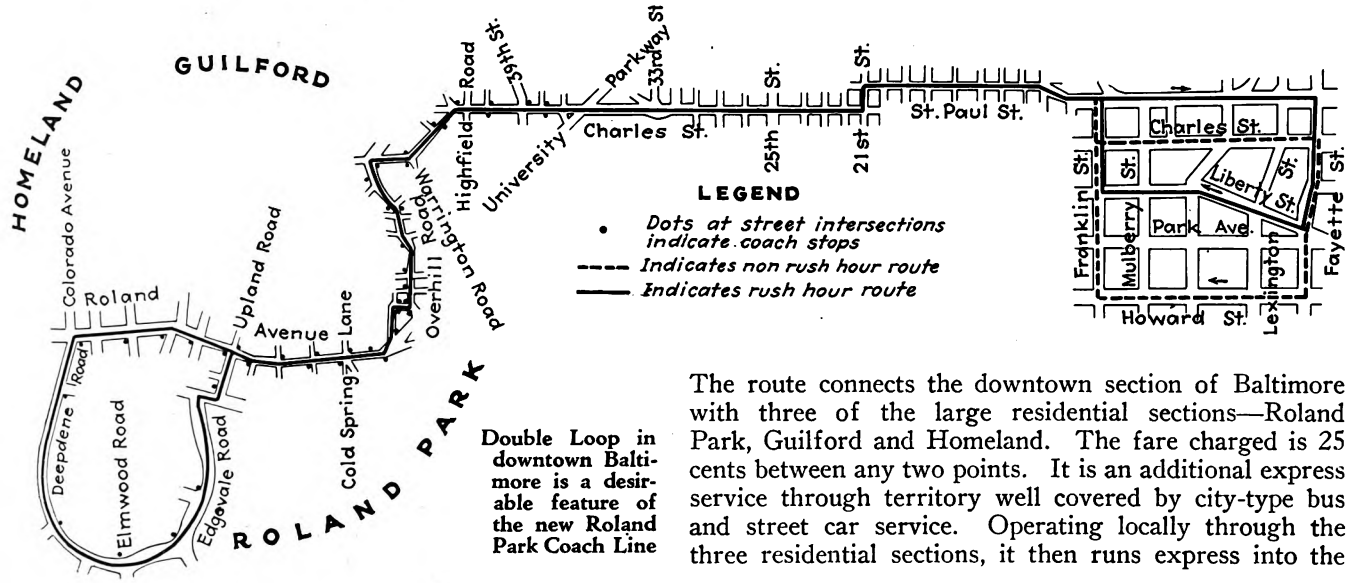
account of the heavy patronage. During the other hours of the day the service operates on a half-hour schedule. From Dec. 7 to Dec. 31, inclusive, the coaches operated 12,850 miles, carried 15,039 passengers and took in $3,859, earning approximately 30 cents a mile. The cost of operating is figured at about 27 cents a mile.

The situation with regard to the Airport Express line is particularly interesting. The route is 12.56 miles in length and runs from the Cleveland Airport to East 22nd Street and Euclid Avenue, operating as an express route through the greater part of the territory. The Berea Bus Line Company operates from Berea, Ohio, to the Public Square over the same route. This interurban line has been in operation for the past six or eight years and has during all that time been doing an interurban business as well as picking up passengers from all points along its route in the city to the Public Square. While this is contrary to the provision of the Collister-Kreuger act of Ohio, it has been permitted by the Cleveland City Council because the Cleveland Railway was not giving adequate service on the same streets.

By resolution of the Cleveland City Council, the Cleveland Railway started operation of the Airport express route on Aug. 23, 1929. During the air races of the National Aeronautical Association this route paid very well, as many as 100 coaches per day being used. However, after the races business immediately dropped off because of the duplicated service provided by the Berea Bus Line and the Cleveland Railway.

The Cleveland Railway route is too long for the rate of fare charged at the present time, namely 15 cents for the first 10 miles, 20 cents for the next zone of 1 mile, and 25 cents within the second zone of 1½ miles. This route is being continued at the request of the City Council, although the Cleveland Railway has requested permission to abandon it. If the Berea Bus Line were required to rely on the income derived from its interurban operation it would undoubtedly lose money, but the combination makes it a paying proposition. In other words, interurban service alone is a losing proposition, express service on a line of this length is a losing proposition, but the combination of the two results in a profitable operation.

In September, 1929, the United Railways & Electric Company, Baltimore, Md., began operation of its first de luxe bus line known as the Roland Park Coach Line.



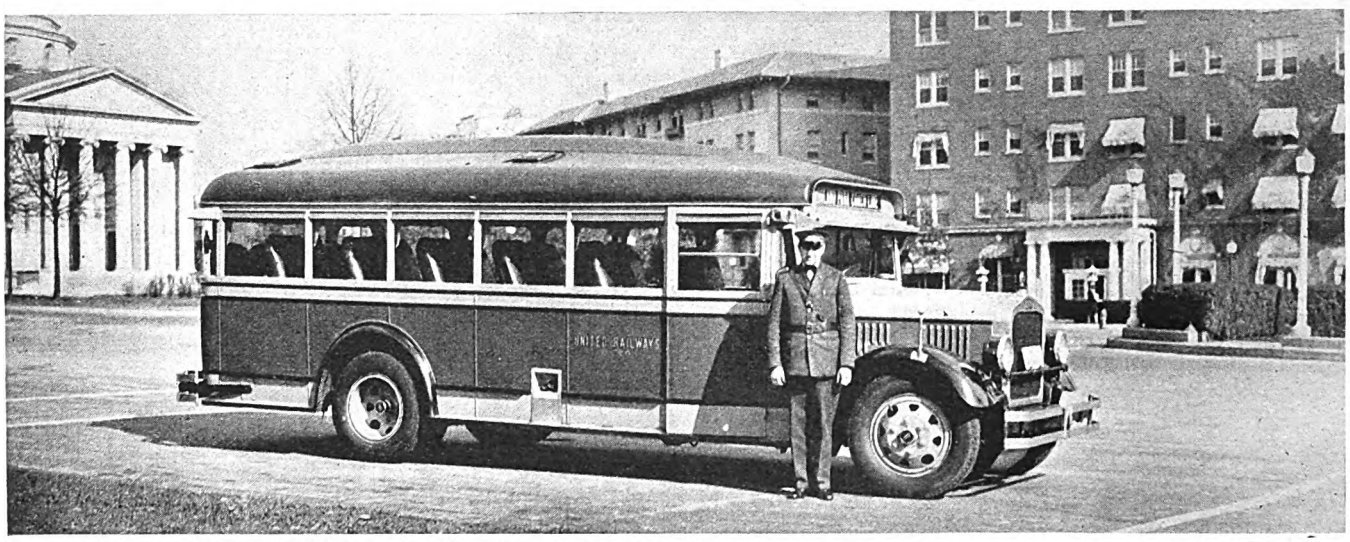
Double Loop in downtown Baltimore is a desirable feature of the new Roland Park Coach Line

The route connects the downtown section of Baltimore with three of the large residential sections—Roland Park, Guilford and Homeland. The fare charged is 25 cents between any two points. It is an additional express service through territory well covered by city-type bus and street car service. Operating locally through the three residential sections, it then runs express into the

Digitized by Google

center of the city. Up to the present time the line has operated only on weekdays, there being insufficient traffic on Sundays and holidays to justify running the buses.

Before establishing this line a very complete survey of the situation was made in conjunction with the Roland Park Company and various civic committees. Letters were mailed to residences throughout the district asking their opinions on the proposed line. The replies were encouraging and the service was started with a complete schedule calculated to produce a patronage that would build up to the capacity of the coaches instead of with a skeleton service that would grow only as increased patronage demanded. The railway company believed that this would familiarize the users of the bus with its full advantages at once, and would achieve the results of having more people change their riding habits. A very unusual feature in the layout of this route consists of a double loop in the downtown section of Baltimore. The loop used in the rush hour is shorter and includes most of the financial and business section of the city, while in the non-rush hour the loop is enlarged to include the better shopping districts.



High class equipment has attracted growing patronage in Baltimore

Other Companies Use De Luxe Bus Equipment

The Boston Elevated Railway operates one 25-cent fare de luxe bus route on Beacon Street and through the business section of the city. The line serves territory which also has car service. Patrons have the privilege of free transfers from the de luxe buses to other service and transfer from other service to de luxe buses upon payment of 15 cents additional fare. The carfares in the territory served by the de luxe line are 6¼ cents for a local ride and 10 cents with full transfer privilege. The scheduled speed of the de luxe service is 12.3 m.p.h. as compared with 11.1 m.p.h. average for all other bus lines. Stopping places are not arranged for express service on this route. Buses stop to take on or let off passengers at any point. However, the equivalent of express service is operated because practically all of the patrons of the de luxe line reside in the territory served by the outer sections of the line.

The Duluth-Superior Coach Company, a subsidiary of the Duluth Street Railway, besides operating six feeder routes to the street railway lines, also operates one de luxe bus service between the business centers of Duluth and Superior. This route furnishes additional service between these two points, as there are street car lines serving the same territory. The type of service is different from the city type of bus service in that Yellow Coach de luxe buses are used on this line, while White, Mack and Reo city-type buses are used on the feeder lines. The fare is 25 cents on the de luxe buses and 7½ to 25 cents on the feeder lines. The speed of this line is approximately 15 m.p.h. as compared to 11 m.p.h. on the street cars.

The Cincinnati Street Railway, Cincinnati, Ohio, on Nov. 21 began operation of a new bus route between the business district of Cincinnati and a new, recently built up high-class subdivision 6 miles from downtown. Four new Mack buses with special 25-passenger bodies are being used. The fare charged is 25 cents. The coaches operate on a 30-minute headway from 7:30 in the morning until 8 p.m., when they go on an hourly headway until midnight.

The lines and type of service so far mentioned have been strictly selective higher fare lines operated for the purpose of appealing to a new type of rider in a community served by city-type operations of both street cars and buses. Quite distinctive from this type of service is another use for the de luxe bus on certain selected city lines. A number of companies are providing the local public on many of their lines with de luxe motor coaches, not as supplementary service at higher rates of fare. The United Electric Railway, Providence, R. I., operates 69 Twin Coaches and 40 of the latest model six-cylinder Whites on lines operating at regular rates of fare, most of which supplanted street cars. Quite a few of these lines are routed and operated as express service, benefiting the residents of outlying districts near Providence. With this equipment they also operate several special routes, two of which are only operated in the summer months to provide supplementary service between Providence and Crescent Park, and Pawtucket and Crescent Park. Crescent Park is a summer shore resort. Excellent results have been secured, particularly on the latter where the earnings have been very high. Two other special routes between Pawtucket and Pawtuxet, and between Olneyville and Pawtuxet are operated on Wednesday and Saturday nights to serve a very fine public ballroom in Pawtuxet. Twin Coaches are used on these lines, which take a more direct route than the trolley car and operates express all the way.

Digitized by Google

Monthly and Other Financial Reports

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Key System Transit Co., Oakland, Cal.					
November, 1929	598,437	.....	.....	.....	*45,726*
November, 1928	588,865	.....	.....	.....	*86,505*
12 mo. end. Nov., 1929	6,502,428	.....	.....	.....	*888,631*
12 mo. end. Nov., 1928	6,606,184	.....	.....	.....	*623,846*
Market Street Railway, San Francisco, Cal.					
December, 1929	817,254	676,519*a*	.....	140,735	83,481*g*
December, 1928	811,968	719,642*a*	.....	92,326	31,982*g*
12 mo. end. Dec., 1929	9,590,194	8,041,926*a*	.....	1,548,268	837,513*g*
12 mo. end. Dec., 1928	9,754,461	8,327.688*a*	.....	1,426,773	677,755*g*
Denver Tramway, Denver, Colo.					
12 mo. end. Dec., 1929	4,214,297	2,902,564	494,201	864,420	351,137
12 mo. end. Dec., 1928	.....	.....	.....	.....	460,960
Jacksonville Traction Co., Jacksonville, Fla.					
November, 1929	92,574	74,447	7,787	9,877	.....
November, 1928	98,840	81,044	9,004	8,261	.....
12 mo. end. Nov., 1929	1,143,880	936,375	106,590	94,740	*62,691*
12 mo. end. Nov., 1928	1,210,294	976,864	109,743	117,213	*47,604*
Honolulu Rapid Transit Co., Honolulu, T. H.					
December, 1929	88.284	52,125	7,888	28,199	17,869
December, 1928	93,890	53,100	13,231	28,653	22,947
12 mo. end. Dec., 1929	1,052,273	608,420	105,832	350,927	213,720
12 mo. end. Dec., 1928	1,076,433	630,341	147,277	312,153	220,077
Chicago Surface Lines, Chicago, Ill.					
December, 1929	5,272,651	4,074,317*a*	.....	1,198,334	909,743*h*
December, 1928	5,334,219	4,188,165*a*	.....	1,146,053	879,486*h*
Boston Elevated Railway, Boston, Mass.					
November, 1929	2,877,280	1,982,281	138,018	761,223	64,148
November, 1928	2,927,910	2,081,326	145,099	705,169	2,583
Eastern Massachusetts Street Railway, Boston, Mass.					
November, 1929	663,198	436,562	19,805	232,687	86,076
November, 1928	703,317	488,821	27,646	206,191	56,170
11 mo. end. Nov., 1929	7,817,586	4,947,492	338,222	2,750,358	870,240
11 mo. end. Nov., 1928	8,202,869	5,342,139	324,680	2,758,475	864,630
Eastern Massachusetts Street Railway, Boston, Mass.					
December, 1929	761,868	495,262	12,959	264,902	130,462
December, 1928	802,888	548,257	40,079	234,488	128,158
12 mo. end. Dec., 1929	8,579,454	5,442,755	351,182	3,015,261	1,000,703
12 mo. end. Dec., 1928	9,005,758	5,890,396	364,759	2,992,963	992,789
Boston, Worcester & New York Street Railway, Framingham, Mass.					
November, 1929	59,262	50,057	1,625	8,209	6,739
November, 1929	677,842	550,012	18,148	121,966	105,796
Department of Street Railways, Detroit, Mich.					
December, 1929	2,078,954	1,773,879	65,457	248,354	104,434
December, 1928	2,154,288	1,699,402	62,529	401,039	246,310
12 mo. end. Dec., 1929	26,444,874	21,057,542	750,948	4,754,779	3,103,189
12 mo. end. Dec., 1928	24,668,175	19,283,497	783,012	4,847,251	2,932,355
Twin City Rapid Transit Co., Minneapolis, Minn.					
12 mo. end. Dec., 1929	13,487,976	11,132,357*a*	.....	2,477,596	1,255,878
12 mo. end. Dec., 1928	13,005,353	11,049,401*a*	.....	2,055,233	833,589
Kansas City Public Service Co., Kansas City, Mo.					
November, 1929	746,136	553,785	41,675	130,674	55,820
11 mo. end. Nov., 1929	8,180,254	6,201,134	458,425	1,520,694	670,150
Kansas City Public Service Co., Kansas City, Mo.					
12 mo. end. Dec., 1929	8,951,616	7,327,003*a*	.....	1,624,613	698,223
Lincoln Traction Co., Lincoln, Neb.					
11 mo. end. Nov., 1929	434,267	380,204*a*	.....	54,063	10,179
11 mo. end. Nov., 1928	438,532	354,905*a*	.....	83,627	.....
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
November, 1929	83,615	62,168	4,300	22,985	*8,198*
November, 1928	82,028	60,341	5,775	19,043	*12,554*
11 mo. end. Nov., 1929	930,295	695,675	79,160	271,229	*77,872*
11 mo. end. Nov., 1928	946,385	681,579	82,110	274,690	*74,850*
Brooklyn-Manhattan Transit Corporation, New York, N. Y.					
December, 1929	5,199,104	3,400,231	303,977	1,565,568	798,552
December, 1928	4,135,153	2,567,829	269,935	1,376,947	673,910
6 mo. end. Dec., 1929	30,409,954	20,422,091	1,900,208	6,508,960	3,851,131
6 mo. end. Dec., 1928	24,135,352	15,710,731	1,652,835	7,263,345	3,106,142
Brooklyn & Queens Transit Corporation, New York, N. Y.					
December, 1929	2,002,528	1,545,106	117,519	361,349	236,588
December, 1928	2,031,999	1,667,806	106,633	280,122	152,553
6 mo. end. Dec., 1929	11,935,555	9,419,520	682,989	1,961,747	1,212,144
6 mo. end. Dec., 1928	12,108,324	10,041,706	644,349	1,552,522	778,965
Hudson & Manhattan R.R., New York, N. Y.					
December, 1929	1,112,472	507,424*a*	.....	605,047	272,289
December, 1928	1,101,309	551,173*a*	.....	550,136	218,098
12 mo. end. Dec., 1929	12,517,756	6,248,096*a*	.....	6,269,659	2,247,210
12 mo. end. Dec., 1928	12,388,927	6,425,643*a*	.....	5,963,283	1,941,056
Interborough Rapid Transit Co., New York, N. Y.					
December, 1929	6,511,920	3,833,653	201,184	2,477,082	*198,880*
6 mo. end. Dec., 1929	35,749,805	22,495,993	1,202,433	12,051,378	*929,179*
Long Island Railroad, New York, N. Y.					
November, 1929	3,084,453	2,460,962	186,121	436,511	240,568*f*
November, 1928	3,194,283	2,299,200	167,515	718,208	528,431*f*
11 mo. end. Nov., 1929	38,215,910	25,323,733	2,844,996	10,029,170	8,227,214*f*
11 mo. end. Nov., 1928	37,404,155	26,027,072	2,560,579	8,797,994	7,119,845*f*
New York, Westchester & Boston Ry., New York, N. Y.					
November, 1929	202,381	142,855	23,476	36,804	*180,499*
November, 1928	199,677	141,673	20,238	38,167	*169,751*
11 mo. end. Nov., 1929	2,312,657	1,427,875	249,380	647,804	*1,724,685*
11 mo. end. Nov., 1928	2,185,487	1,469,160	219,725	507,977	*1,724,237*
Staten Island Rapid Transit Co., New York, N. Y.					
November, 1929	216,406	147,545	15,000	53,861	54,954*f*
November, 1928	259,344	160,942	10,641	88,402	49,192*f*
11 mo. end. Nov., 1929	2,441,623	1,801,677	191,800	448,129	383,289*f*
11 mo. end. Nov., 1928	2,885,228	1,938,564	207,850	737,956	326,935*f*
Third Avenue Railway, New York, N. Y.					
November, 1929	1,256,076	969,639	81,656	224,548	*40,059d*
November, 1928	1,278,000	983,039	85,920	233,686	*19,045d*
5 mo. end. Nov., 1929	6,392,582	4,928,417	443,823	1,123,354	*179,835d*
5 mo. end. Nov., 1928	6,475,397	4,985,680	466,277	1,118,046	*133,992d*
Third Avenue Railway, New York, N. Y.					
December, 1929	1,729,135	1,527,285	.....	201,850	*30,368d*
December, 1928	1,315,791	1,102,341	.....	213,450	*21,519d*
6 mo. end. Dec., 1929	7,671,717	6,447,525	.....	1,224,192	*210,204d*
6 mo. end. Dec., 1928	7,791,188	6,554,300	.....	1,236,888	*155,311d*
Philadelphia & Western Railway, Norristown, Pa.					
December, 1929	80,311	48,624*j*	.....	.....	31,687
December, 1928	80,883	50,148*j*	.....	.....	30,735
December, 1929	804,968	631,889*j*	.....	.....	173,079
December, 1928	843,489	659,934*j*	.....	.....	183,555
Philadelphia & West Chester Traction Co., Upper Darby, Pa.					
11 mo. end. Nov., 1929	1,120,128	.....	.....	.....	.....
11 mo. end. Nov., 1928	1,178,547	.....	.....	.....	.....
United Electric Railways, Providence, R. I.					
November, 1929	592,761	475,434	29,244	88,083	37,163
November, 1928	603,645	481,599	35,376	86,670	38,591
11 mo. end. Nov., 1929	6,636,790	5,330,436	353,544	952,809	392,020
11 mo. end. Nov., 1928	6,837,595	5,473,112	355,807	1,008,676	433,759
Texas Electric Railway, Dallas, Texas					
November, 1929	168,197	146,035*a*	.....	22,162	.....
November, 1928	176,306	141,546*a*	.....	34,760	.....
11 mo. end. Nov., 1929	1,706,494	1,515,751*a*	.....	190,743	.....
11 mo. end. Nov., 1928	1,646,095	1,453,234*a*	.....	192,861	.....
Galveston-Houston Electric Co., Houston, Texas					
November, 1929	42,237	24,029	2,714	15,492	.....
November, 1928	49,171	26,294	2,931	19,944	.....
12 mo. end. Nov., 1929	592,018	332,258	31,205	228,748	*41,254*
12 mo. end. Nov., 1928	649,540	376,764	31,743	241,033	*28,472*
Houston Electric Co., Houston, Texas					
November, 1929	274,652	169,539	10,742	94,371	.....
November, 1928	280,016	171,629	21,484	86,912	.....
12 mo. end. Nov., 1929	3,378,970	2,093,987	284,469	1,009,179	609,606
12 mo. end. Nov., 1928	3,328,886	2,039,678	294,799	994,408	583,867
Pacific Northwest Traction Co., Seattle, Wash.					
November, 1929	81,198	60,556	2,896	17,744	.....
November, 1928	69,317	62,373	4,043	2,899	.....
12 mo. end. Nov., 1929	949,477	731,715	55,324	162,435	45,945
12 mo. end. Nov., 1928	884,529	735,453	51,193	97,881	*65,051*
Calgary Municipal Railway, Calgary, Alta.					
11 mo. end. Nov., 1929	937,348	565,473	.....	371,875	38,954
11 mo. end. Nov., 1928	.....	.....	.....	.....	53,322
Edmonton Radial Railway, Edmonton, Alta.					
November, 1929	72,647	45,842	.....	23,348*e*	1,956
November, 1928	59,656	44,492	.....	21,743*e*	3,418
11 mo. end. Nov., 1929	763,602	494,664	.....	260,158*e*	9,528
11 mo. end. Nov., 1928	726,278	485,301	.....	242,173*e*	802
Lethbridge Municipal Railway, Lethbridge, Alta.					
10 mo. end. Oct., 1929	50,298	41,175	.....	9,123	*16,731*
10 mo. end. Oct., 1928	.....	.....	.....	.....	*22,606*
British Columbia Electric Railway, Vancouver, B. C.					
November, 1929	1,270,922	697,209	.....	573,713	.....
November, 1928	1,192,080	614,212	.....	577,868	.....
5 mo. end. Nov., 1929	5,995,951	3,315,156	.....	2,680,795	.....
5 mo. end. Nov., 1928	5,622,233	3,067,509	.....	2,554,724	.....
Regina Municipal Railway, Regina, Sask.					
11 mo. end. Nov., 1929	383,437	234,931	.....	128,506	18,778
11 mo. end. Nov., 1928	.....	.....	.....	.....	218

Italic figures indicate deficit. *a* Includes taxes. *b* Net operating revenue. *c* Before taxes. *d* After adjustment bond interest. *e* Includes depreciation. *f* Net after rents. *g* Before depreciation and federal tax. *h* After joint account expenses, federal taxes, and city's 55 per cent. *j* Includes interest and taxes.

Digitized by Google

Letters to

Two-Color or Three-Color Signals

NEW YORK, N. Y., Jan. 1, 1930.

To the Editor:

In a recent report issued by the National Committee for Municipal Traffic Ordinances and Regulations, certain proposed standards for the regulation of vehicular traffic were recommended. The more important of these deal with the proposal to employ three-color light signals at locations where a two-color signal might suffice. Since definite positions contrary to these recommendations have been taken by traffic officials of at least two major cities, New York and Los Angeles, the decision seems at least open to question.

It is important to note that this recommendation is predicated upon a tabulation of replies to questionnaires sent by the national committee to some 200 municipalities where traffic control signals are now in operation. The purchases and installation of the traffic control systems in these 200 municipalities as a rule have not been by the official department directing traffic, usually the police department, but in general by the Aldermanic Council or Town Trustees. Ordinarily neither of these two bodies includes traffic control engineers, nor is it versed in the art of traffic control signaling. The bidders proposing to supply traffic control apparatus, with the exception of one or two manufacturers who had undertaken to furnish traffic control signal units as a side line, were persons politically affiliated and in a favorable position to secure a contract. After receiving the award these persons generally established a temporary factory wherein were assembled the signal housings or such other apparatus as could not be purchased in the open market. Obviously these manufacturers preferred to sell three-color light signals upon which the profit was comparatively large.

From the foregoing it may be inferred that, in adopting a tabulation of the replies received in the questionnaires, the national committee has based its recommendation on apparatus supplied by certain manufacturers not making a specialty of producing traffic control signal apparatus, as distinguished from a recommendation based on protracted tests made by competent traffic control engineers to determine the superiority of one or the other signal system.

POLITICS A FACTOR IN SIGNAL EQUIPMENT

Unfortunately, owing to the political onus usually associated with awarding such contracts most of the established and largest manufacturers of signaling systems, who have had long experience in that field, have held aloof from street traffic control. One major city has had the local public service corporation finance, install and maintain the traffic control system at a service charge of $55 per signal unit per year, thereby relieving the city of all major responsibility. Obviously the position of the national committee precludes making such a recommendation.

With reference to the indications for governing existing traffic, the conditions under which vehicular traffic operates may be classified as follows:

1. Congested traffic lanes: for example, the hub arteries of a major city where traffic ordinarily is so dense that comparatively slow movement occurs.

2. Major traffic lanes: these include the more important arteries extending from the congested areas to the outlying districts and adjacent towns, on which vehicles may travel in groups at comparatively high speed.

3. Maladroit intersections: those other than simple right-angled intersections, blind streets, etc.

FOUR GENERAL TYPES OF CONTROL

For the above three conditions of traffic the following systems of signaling may be adopted:

1. Synchronous, where all vehicles traveling in parallel directions proceed for a fixed interval of time, alternately with all remaining stationary for a similar, or differing, period of time.

2. Progressive, where successive blocks show the same signal indication in conformance to the speed-distance factor determined by the rate at which traffic may pass through. Such ideal conditions of block length are rarely found. In this system the driver of a vehicle will always find a green signal at the approach to an intersection providing he has traveled at the prescribed speed. Obviously no yellow signal is required.

3. Speed-distance or co-ordinated, based on the speed-distance factor of each block traversed, long or short. In such a system the driver will always find a green signal as he approaches the intersection, provided he travels at the prescribed speed. This system permits group movement of vehicles. Obviously such a system is ideal and does not require the yellow light.

4. Special control, more generally applied to maladroit intersections, and dealing with conditions too complex to discuss here. With the exception of manual control they can usually be covered by systems 1 or 3.

Let me refer now to the application of systems 1 to 4 to the conditions (a), (b) and (c), previously named.

Condition (a): Congested traffic lanes comprising the hub area of the major cities. The traffic is ordinarily so dense that high-speed group movement of vehicles cannot be obtained. Obviously the more simple two-color (green and red) synchronized system will suffice, being not only more economical and simple to install but more simple to operate and less costly to maintain. Owing to the comparatively low speed the moving vehicles can be stopped within a few feet and no yellow signal is required.

Condition (b): Major traffic lanes extending from congested districts to outlying districts and adjoining towns. As these lanes not only permit a higher speed, but also group movement to obtain maximum capacity, obviously the co-ordinated system should be installed. If the vehicle driver proceeds at the proper speed he will always find a green signal at the approaching intersection. It is therefore obvious that no yellow signal indication is required.

From the foregoing it will be apparent that a maximum flow of traffic may be effected by the use of two-color signal indications only, and that the ideal systems for obtaining maximum traffic do not require a third indication. Furthermore, investigations where the yellow signal is employed indicated that the motorist will speed

Digitized by Google

the Editor

up his car on yellow in an attempt to beat the red signal which he knows is coming. This appears to be universal at non-policed intersections.

It is also important to note that in the standards adopted by the Railway Signal Association, which have been in effect for many years, the yellow signal, when employed, indicates proceed, prepared to stop at the next signal. Obviously, the meaning established by the Railway Signal Association standard is very different from that conveyed by the recommendations of the national committee, and confusion of standards will occur.

It is also rather unfortunate that the names of one or more of the traffic control engineers, who have had from 30 to 50 years experience with steam railroads, do not appear on the roster of the national committee.

O. A. Ross, C. E.

Railway Crossing Signals Should Be Distinctive

NACHOD & UNITED STATES SIGNAL CO., INC.
LOUISVILLE, KY., Jan. 8, 1930.

To the Editor:

As manufacturers of highway crossing signals for electric railways, we have noted a certain trend which we think merits discussion. One cannot fail to mark how implicitly the traffic signal indications are obeyed by automobilists; and, on the contrary, unfortunately, anyone can recall how many times at a highway crossing signals indicating the approach of a train have been wantonly disregarded by motorists. What more natural than that the railways, solicitous to have their crossing signals obeyed, should set up at their crossings with highways indications that look like or imitate traffic signals, showing green normally to the street, and red when there is a train approaching? We ourselves have sold a number of such highway crossing signals, when so specified by the purchaser, and we note that certain steam roads are installing such indications at their highway crossings.

We think this is essentially wrong, since a traffic signal is a "stop and stay" signal, the indications being periodically reversed; while the highway crossing signal, for which a distinctive indication has been specified by the Signal Division of the A.R.A., is a cautionary signal in the nature of a "stop and proceed" signal. The autoist when confronted with a crossing signal in operation should stop and wait a reasonable time; and then, if no train appears, should drive close enough to the crossing to see for himself, before he crosses. It is manifestly impossible to control a highway crossing signal so that it will always mean that a train will pass the crossing in so many seconds; for the train may be stopping within the warning zone, or it may be shifting over the tracks but not approaching the crossing. This means that the automobilist will be indefinitely held up, or he must violate a signal which he has been taught to consider as a "stop and stay" signal.

Moreover the railroad, by exhibiting a normal green at the crossing, which is the most unrestricted clear indication possible, invites the autoist to cross on the strength of that indication alone without stopping and without looking. If a normal indication is wanted, yellow, which is cautionary, at least imposes care in crossing. The writer is of the opinion that the traffic signal indications of alternating red and green, with or without the intermediate yellow, should be reserved for traffic signals, and flashing lights or wigwag signals reserved for railroad crossings.

CARL P. NACHOD.
President and Chief Engineer.

Extensive Paving Work Done by San Francisco Municipal Railway

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS, MUNICIPAL RAILWAY

Dec. 21, 1929.

To the Editor:

Your survey of paving practices of the railways of the United States, as contained in an article appearing in the ELECTRIC RAILWAY JOURNAL on page 1108 of the December, 1929, issue, has been read by me with considerable interest. Your readers might infer from this article, however, that the Municipal Railway of San Francisco is relieved of all paving charges which the private companies are subject to. For your information, the following statement of the paving charges of the Municipal Railway for the last three years is detailed:

Fiscal Year 1926—1927	Maintenance	$18,209.69	
	New construction	1,907.60	
	Replacements	25,578.81	
	Total		$45,696.10
1927—1928	Maintenance	$19,555.45	
	New construction	8.00	
	Replacements	6,797.99	
	Total		26,361.44
1928—1929	Maintenance	$16,667.11	
	New construction	102,461.48	
	Replacements	9,560.61	
	Total		128,689.74
	Total July 1, 1926 to June 30, 1929		$200,746.20

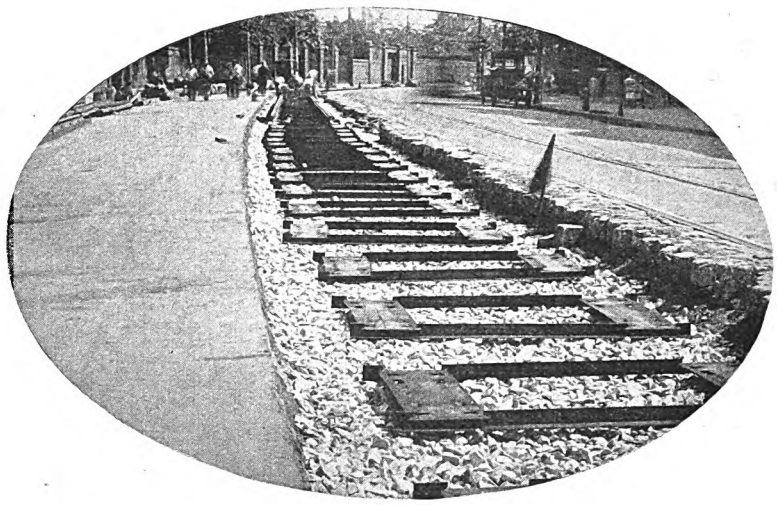
From the above statement it will be seen that over $200,000 was expended by the Municipal Railway in the last three years for paving, of which nearly one-half was for maintenance and replacements. Considering that the Municipal Railway has approximately 80 miles of single track of railroad to maintain, it will be readily seen that sufficient expenditure has been made to keep the paving in first-class order.

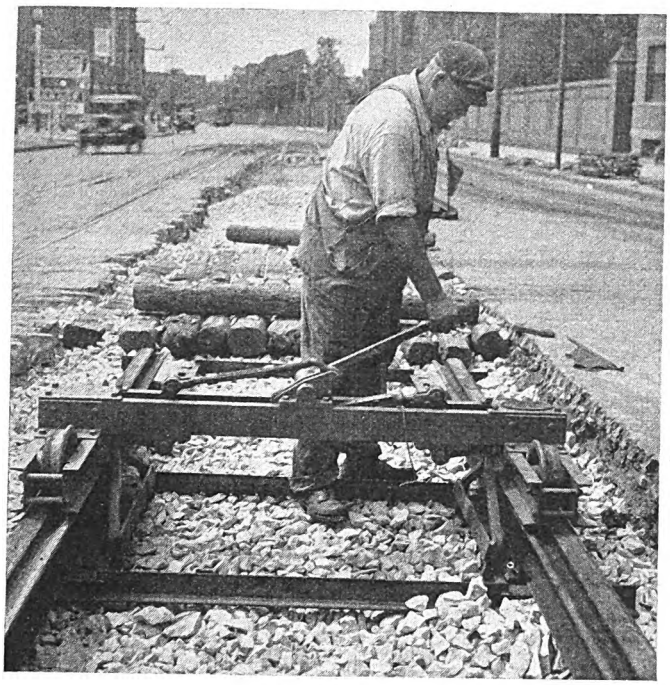
The general impression given to the public by the reading of articles in various railway and other publications is that the Municipal Railway of San Francisco has considerable work performed for it by the city of San Francisco for which no charges are made. This is an entirely erroneous conclusion, as the Municipal Railway pays the city of San Francisco for all work performed for it.

F. BOEKEN,
Superintendent.

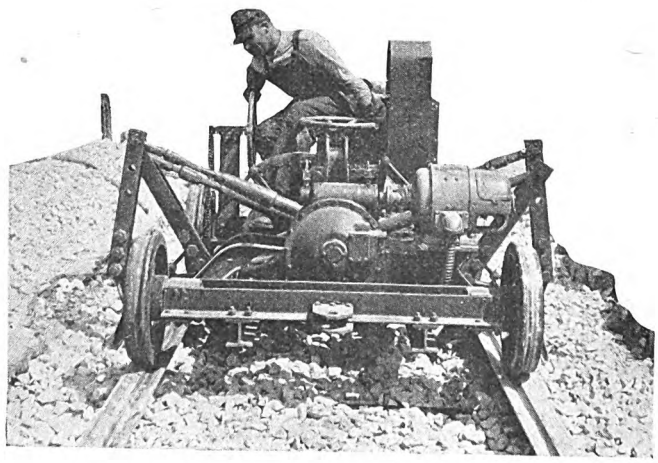
Digitized by Google

International steel Twin Ties spaced 6 ft. center to center were laid on a 3-in. layer of broken stone





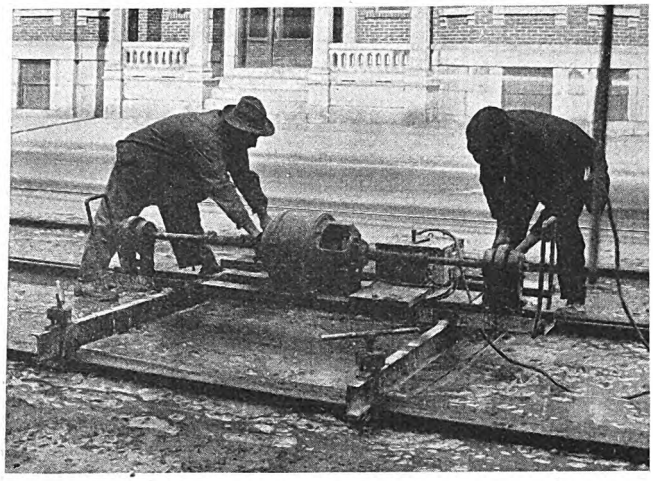
Seven-inch grooved girder rail was used with rolled-steel joint plates seam welded



Track was brought to correct line and grade by machine tamping

Digitized by Google

Digitized by Google



Penetration of the grout was assured by use of a revolving vibrator placed longitudinally between the rails

operate over such track as soon as it has been brought to line and grade and during the time the grout is setting.

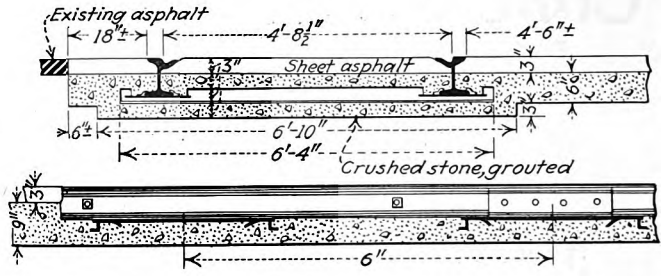
Interesting evidence of the strength of this design was furnished by an accident which occurred a short time after the completion of the Huntington Avenue job.

Weight Test Proves Solidity of Structure

On the night of Dec. 14, a 30-in. high-pressure water main, located about 9 ft. below the surface of the street, burst, and before the water could be turned off a hole approximately 30 ft. long and 25 ft. wide at the top, and about 9 ft. deep, resulted. All of the earth under the in-bound track for a distance of about 30 ft. was removed and the excavation extended across the out-bound track as well for a length of approximately 20 ft.

During the period of excitement, a Boston Consolidated Gas truck, weighing about 5,000 lb., passed over the street which was undermined and fell into the excavation head first. The Boston Elevated wrecking truck was called and in order to take the gas company's truck out of the hole it was necessary for the wrecking truck to stand on the track which was undermined as described above. The weight of the Boston Elevated wrecking truck is about 12,800 lb. and it was estimated that it lifted one-half the weight of the gas company's truck, or 2,500 lb., so that the total weight on the unsupported track was 15,300 lb.

The tracks were damaged very little as a result of the water break and the removal of the gas company's truck. The in-bound track, being unsupported for a distance of 30 ft., sagged of its own weight slightly. The out-bound track, however, remained to proper surface.



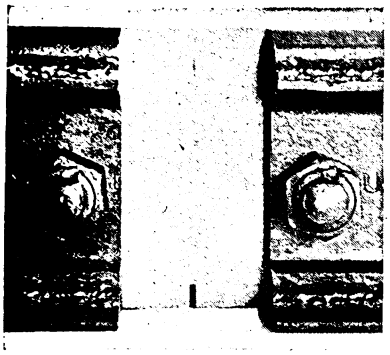
Sectional views of concrete track in Boston built by placing broken stone and grouting the voids

The pavement in the space between the two tracks was broken through in order to facilitate the placing of shoring to support the tracks and to allow the city departments to make the necessary repairs. Has this not been necessary, the concrete and asphalt pavement would have remained intact for the entire track area—that is, the tracks, the dummy and the brows.

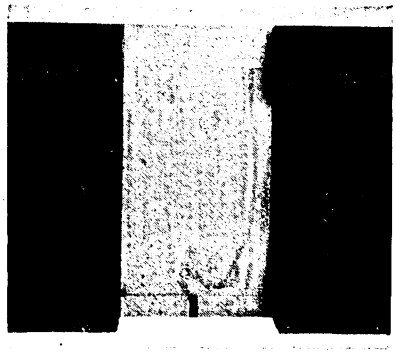
When the repairs to the underground structures were made, car service was resumed on both tracks, these tracks being supported by shoring. No further repairs to the tracks were necessary except to replace the pavement. The excavation caused by the water has been filled in, but the shoring supporting the tracks was allowed to remain in place, as the final settlement of the fill will not take place for a considerable period. This occurrence furnished an interesting demonstration of the solidity of a structure of this design.

The paving surface consists of a 3-in. layer of sheet asphalt

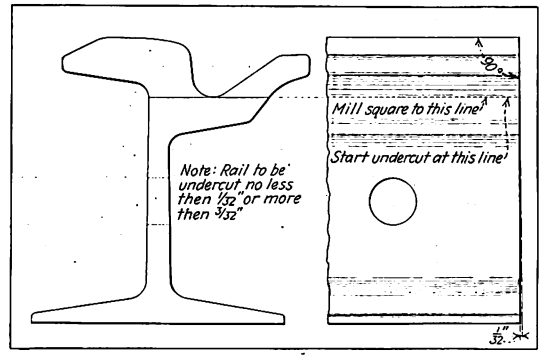
Digitized by Google



The standard practice of undercutting rails from head to foot permits a gap to appear as the rail wears which gradually causes cupping



By milling the heads square after the standard undercut is made, there can be no gap and the danger of cupping is minimized



The practice adopted by the Cleveland Railway is to mill the rail head square and undercut from the base of the rail head to the foot of the rail. This is giving very satisfactory results

Double-Milling Rail Heads to Prevent Cupping at Joints

By Howard H. George
Superintendent of Way Cleveland Railway

PROBABLY no part of the track structure has given more trouble than the joint, and it has been the subject of a large amount of study and investigation. The goal toward which railway engineers have been striving has been a joint which would have a life equal to the rail without cupping, but the number which produce such results has been rather small as compared with the total number installed. Assuming that splice bars are of a suitable design, that an adequate seam weld has been provided and that the mechanical assembly of the joint has been properly made, there is only one factor left, which is generally responsible for past failures. That is the flowing of the rail steel into the small gap between the rail ends which soon causes the head of the remaining rail to cup.

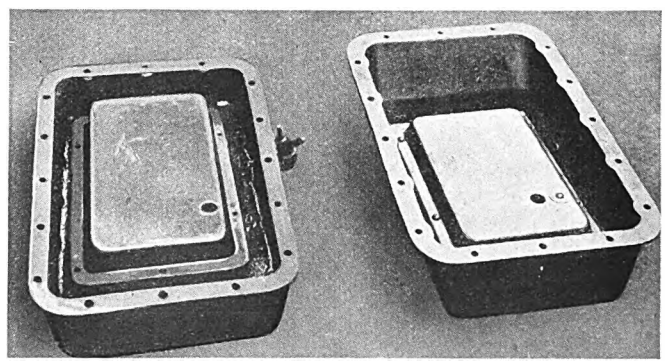
For a number of years it was the general practice to specify rail ends to be milled square. In practice, however, it was found that it was impossible to mill these rails exactly square and that sometimes the rail bases of the abutting rail ends made contact before the heads. This, of course, made it impossible to close the gap. To overcome this difficulty the specifications were revised to provide for undercutting all rail ends from head to base, thus insuring initial head to head contact when the joint was first assembled. This has been the practice for several years and is the method now generally followed. Since the rails are undercut for their entire depth, however, as the head wears down there develops an opening between the ends of the rails. As the gap widens, metal from the head of the sending rail flows down into the opening, allowing the car wheel to strike a blow on the receiving rail, the result being the relatively early appearance of rail cupping.

Electric railway engineers have long sought to eliminate, or at least minimize this trouble, resort frequently being had to the use of shims. During the present year, the writer arranged with one of the rail manufacturers to experiment with the double-milling of rail ends as developed in the way committee of the American Electric Railway Engineering Association about four years ago and later patented by E. M. T. Ryder, way engineer of the Third Avenue Railway. The method followed is shown on the accompanying sketch. The rails were first undercut in accordance with existing standard practice and then the heads were milled square. Each rail was carefully checked at the milling machine by the machine operator and also by the inspector.

Accompanying photographs show clearly the difference in the results obtained, as between the standard undercutting and the square milling of the heads. These joints were made up in the usual way by drifting the rail ends together with $1\frac{1}{8}$-in. diameter drift pins, reaming the holes and bolting up with $1\frac{1}{8}$-in. diameter heat-treated bolts. The joints were then seam-welded, using the hand feed method of welding with extra low carbon welding rods. The splice bars have a carbon content between 0.2 and 0.3. They were then machined through, as shown, to expose the conditions in the center of the joint. The practically perfect contact of rail ends throughout the entire depth of the head as well as the perfect contact along the fishing surfaces are felt to constitute ample justification for the additional expenditure of 75 cents per ton involved in the extra milling operation.

Deep Crankcase Pans Prove Advantageous

INCREASING by 2 in. the depth of bus crankcase pans has proved advantageous for the International Railway of Buffalo, N. Y. The oil capacity is increased approximately 77 per cent. This increase in possible oil storage has served to eliminate the mid-day follow-up of buses for the purpose of adding oil to motor crankcases. Buses are getting approximately 28 miles to a quart of oil. Old crankcases held 9 qt. of oil, while the new and deeper crankcase pan holds 16 qt. of oil.



Deeper crankcase eliminates the necessity of replenishing oil supply of the bus at mid-day

Digitized by Google

One-Man Long Level*

By R. B. Evans
Assistant Superintendent of Construction
Cleveland Railway

IN CHECKING the level of the subgrade and the stone track foundation it is often necessary to use a level board longer than ordinary. To facilitate this work, the Cleveland Railway has designed a long level board which can be handled by one man. This board is

Long level board, designed by the Cleveland Railway to be handled by one man

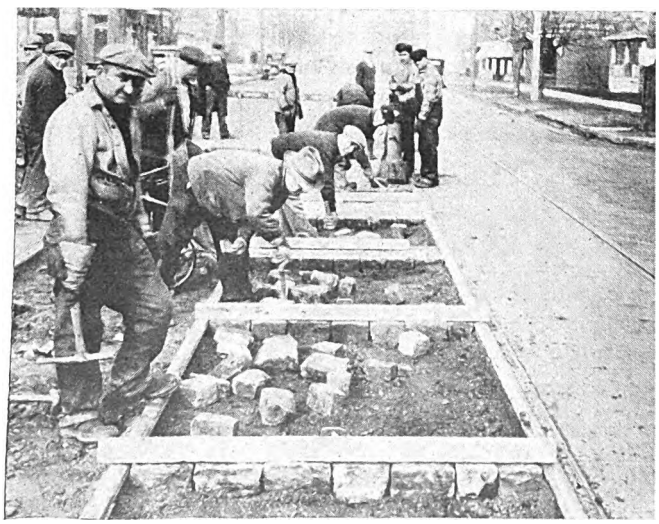
10 ft. long, 1½ in. wide and 4 in. high in the center, tapering to 2½ in. on either end. A strip of sheet metal is fastened to the bottom side to preserve its wearing surface. At the free end of the board is placed a level glass where it is easily seen by the operator. At the same end there is also a graduated metal gaging rod, which can be set to any distance desired, being held in position with a setscrew.

Pavement Straight Edge*

By P. H. Costello
Paving Inspector Cleveland Railway

GREATLY improved pavement surface and increased production per man have resulted from the use of a "pavement straight edge" made in the Cleveland Railway shops. This new device has also made it unnecessary for a workman to follow the pavers to raise or lower inaccurately placed stones. Past experience on the Cleveland Railway indicated that, when laying granite block pavement in the track area, the paver did not always lay the block to a uniform surface. Use of the new "pavement straight edge" has corrected this.

The device consists of a piece of soft wood 5 ft. 6 in. long, 2 in. wide and 3 in. high, well seasoned, and planed on the bottom side, to which is fastened a metal strip to preserve its wearing surface. On top is a hand grip to facilitate handling by the paver.



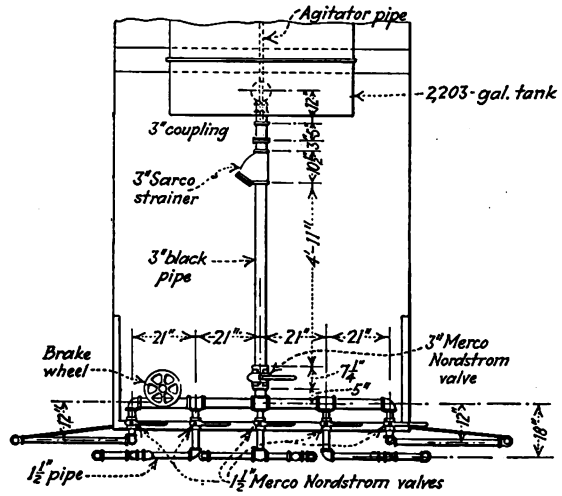
When paving with granite blocks the Cleveland Railway uses straight edges to insure level surface

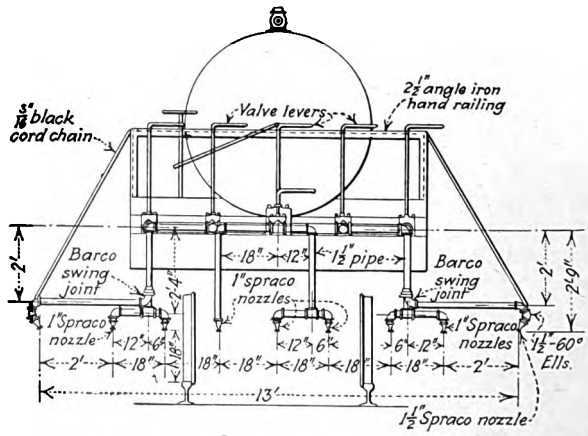
**Submitted in* Electric Railway Journal *Prize Contest.*

Spray Equipment Effective for Weed Killing*

By A. G. Pirkle
Georgia Power Company, Atlanta, Ga.

FOR removing weeds from between tracks the Georgia Power Company has designed a spray equipment for distributing a weed-killing chemical. This apparatus is erected on a flat car and connected by pipes to a tank carrying the solution. The spray equipment is moved





Weed killing is carried on by means of spray equipment designed by the Georgia Power Company

over the roadbed by a sand car, which is equipped with an air compressor. Compressed air is brought by means of a hose to the tank containing the solution, which is then forced out through nozzles at the desired pressure. The chemical used is non-poisonous and is shipped in a concentrated form which must be diluted by taking 4 gal. of water and 1 gal. of the concentrate. After the solution is made it is agitated about ten minutes by applying

Digitized by Google

a pressure of 30 lb. of air through a perforated pipe running the full length of the tank, the top of which is left open. At a working pressure of 30 lb. per sq.in., each of seven small nozzles sprays 8½ gal. per minute and each of two large nozzles sprays 24 gal. Thus the total capacity is 107½ gal. per minute. This requires an air compressor which has a capacity of at least 60 cu.ft. of air per minute.

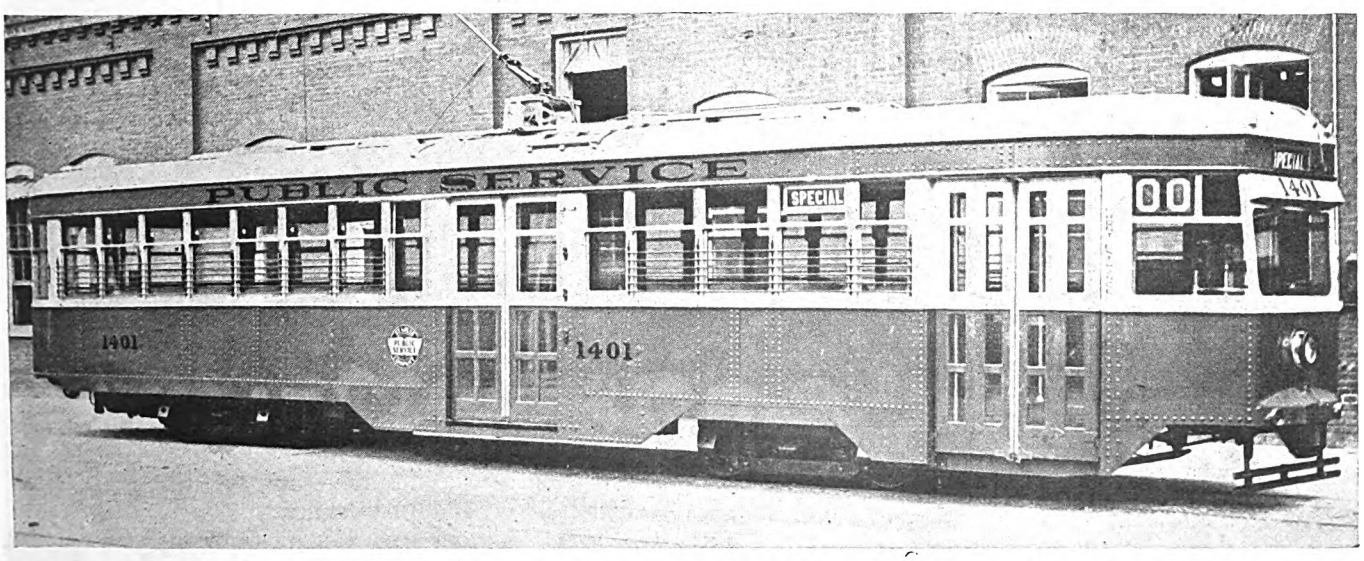
Manufacturer's specifications call for 472 gal. of diluted solution per mile. To discharge that amount, a speed of about 40 m.p.h. is required. While operating, the car is run as near to that speed as can be estimated by the motorman. The spray nozzles are controlled by individual valves, which makes it possible to apply the chemical only where vegetation exists. When all nozzles are open, the width of the spray is about 15 ft. This method is more economical than the old method of hand weeding. In three days all weeds were killed in a track area of more than 20 miles of single track, thus making it possible to have a clean roadbed during the entire growing season. Concentrated chemical totaling 1,473 gal. was used, which at 38 cents per gallon cost $567.92. Labor cost for the three days was $92.94, five men being employed where four could have done the job. The total cost was $660.86 for 20.08 miles of single track, or $32.91 per mile.

Distinctive Features in Sample Car

Built by St. Louis Public Service Company

IN THE past two or three years a number of experimental and sample cars have been constructed by the electric railways and manufacturers. All of these have embodied new ideas in their design and have contributed to the development of the modern car to suit present-day needs. The latest car to make its appearance is a sample car recently completed for the St. Louis Public Service Company, St. Louis, Mo. Like the others, the St. Louis car has in addition to certain features tried in other cars a number of new ones. Among its interesting features are automatic pedal control, resembling in the arrangement of the pedals that of an automobile, a switch to hold the controller in full series position, a pedal for preventing emergency braking when the hand is released from the dead-man control, a control panel for the buttons and levers operating the gong, sand, doors, emergency braking and heaters, a stanchion arrangement in the front which makes fare collection for the one-man operator easier, extensive use of aluminum throughout the car, equal mounting of equipment underneath the car, a reverser control mounted in a pedestal at the rear, a motor-operated fare box and an attractive appearance, both exterior and interior. As the car includes those elements of design which the company feels are desirable for standard service on its system, the company plans to use it as a sample when ordering new equipment as needed.

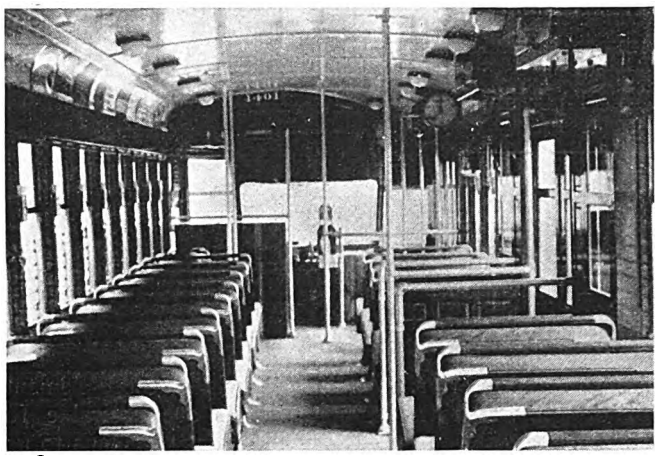
Westinghouse electro-pneumatic control, actuated with line current, is installed in the car. It is the VA variable automatic type, switch-operated. The master control, operated by a pedal, is mounted in a cabinet recessed in the floor. The air brakes, of General Electric design, also are pedal-operated, with a self-lapping valve. The arrangement of the two pedals differs from previous installations in that the pedal for acceleration is on the right and the pedal for braking on the left. This change was made to make the operation of the car more nearly like that of an automobile, and hence more natural for most motormen. Both pedals are depressed with the right foot, so that in both braking and accelerating the action for the right foot is the same as in starting and stopping an automobile. In starting, the brake pedal is released and the accelerator pedal on the right depressed; in stopping the procedure is simply reversed. Of course with no gears to shift and no clutch pedal to operate the left foot remains idle.



A pleasing appearance was obtained by a low roof, a 5-in. skirt below the side sill and streamline painting

Digitized by Google

Unit switches for the control are mounted in a cabinet at the rear of the motorman, another departure from usual practice. This cabinet extends out from the side of the car making a partition between the motorman's compartment and the remainder of the car. Action of the various control switches is obtained through an air-operated sequence drum. Another innovation is a series control switch which stops the advance of the control when full series position is reached. This is



Front half of the car showing the arrangement of stanchions and the type of seats used

particularly useful for switching and operating at slow speeds through congested downtown districts.

Immediately in front of the operator's seat and over the two pedals is a control panel on which are mounted a brake-locking switch, controls for both the front entrance and center exit doors, a dead-man control button, a handhold, and buttons for operating a gong, releasing sand and controlling a heater circuit.

New Type of Deadman Control

If the motorman wishes to leave his position at the front of the car he may do so by locking the brakes with a device on the control panel. The dead-man control button is located at a convenient position for the left hand. In a corresponding position on the right is a handhold of the same size and shape for the operator's right hand. If the operator wishes to remove his hand from the dead-man control button he may prevent an emergency braking by depressing a pedal near the floor. The heater circuit is controlled by two buttons so that the heater current can be utilized for throwing track switches. These buttons have absolute control regardless of the thermostat standing.

In addition to the regular reverser at the front of the car there is a second, located in the center of the semi-circular rear end. A Westinghouse drum control switch and a General Electric brake valve are mounted in the enclosed pedestal. To operate the reverser, the cover is simply released and slid up a stanchion to a resting position. An automatic gong in the base of the pedestal is a further help for the operator in backing up his car.

Entrance is gained to the car through double outward-folding doors at the front. By locating stanchions in the front vestibule as shown in an accompanying illustration, it is possible for a large number to board the car, yet all must pass by the fare box in single file. This allows quick loading and positive collection from every passenger. Two half-seats on the left side at the front allow free passage for the passengers after leaving the fare box. The circulating load principle is employed, the passengers leaving by treadle-operated sliding doors in the center. Fare collection is made with a Johnson fare box, operated with an air motor. It is lighted by a lamp in a specially constructed reflector box with louvre construction, which allows good lighting of the fare box but prevents the light from glowing at the operator or boarding passengers.

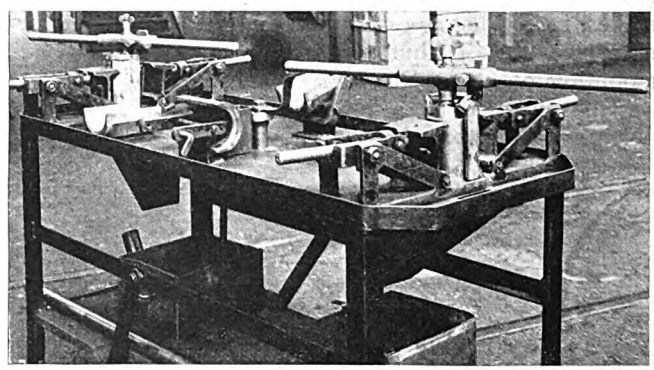
Aluminum was used for practically the entire body. Body bolsters, stanchions, conduits for wiring, posts, letterboard and carlins (one at each post) are all of this metal. Aluminum was used also for all of the ceiling except the circular ends which are of Agasote. Almost all air brake and door control piping is of copper with brass fittings. Air compressors and reservoirs were located under the rear of the car to give a more even distribution of weight between the front and rear trucks. The car has a total weight of 36,180 lb., divided 19,380 lb. for the body, 10,800 lb. for the trucks and 6,000 lb. for the motors.

Careful attention was given to obtaining a pleasing appearance, both exterior and interior. With a narrow letterboard, low roof, streamline painting and a skirt, obtained by extending the side plate 5 in. below the side sill, a racy appearance was obtained. A wide single-piece window, equipped with two vertical-acting window wipers, a dash-lighting headlight and a sun visor, gives a distinctive air to the front. The car exterior is finished in orange and cream, trimmed in red. Its roof is gray and the window guards and lettering are black.

With 26 cross-seats, three single seats and provision for seven passengers in a circular seat at the rear, the car has a total seating capacity of 62.

Repair of Interchangeable Bearings*

By Max Feigenspan
Mechanic Hamburg Elevated Railway
Hamburg, Germany



Portable bench for reaming and finishing relined bearings in the Hamburg Elevated Railway shops

FINISHING bearings which have just received a new lining is greatly simplified by the use of a specially constructed portable bench in the shops of the Hamburg Elevated Railway. The bench is provided with four vises, each of which holds the bearing in a different position. This facilitates the finishing of its surface on all sides. After reaming has been completed the bearing can be placed in the center vise in a nearly horizontal position and further finished by hand if this is desirable. Bearings are held in place by adjustable claws.

**Submitted in* Electric Railway Journal *Prize Contest.*

Digitized by Google

Causes of Wheel Failure Studied at Havana

By Otto Gottschalk
Engineer Car Equipment Department
Havana Electric Railway

RECENTLY it came to our attention in Havana that none of our cast-iron chilled car wheels were being removed because of wear on the tread, but rather because of low flanges due to chipping. This called forth an investigation which brought us to the conclusion that the chipping was due to a combination of two conditions: first, flange-bearing switches, mates and frogs; second, method of molding and chilling the wheel.

The Havana Electric Railway operates 600 single-truck cars, all equipped with cast-iron chilled wheels of 30-in. diameter, 2½-in. tread and ⅝-in. flange. In the city the track consists of grooved running rails with numerous sharp curves, switches and crossovers. The crossovers, switches and mates are of the flange-bearing type. Outside the city the track system consists of tee rails, non-flange-bearing switches, frogs and crossovers. Storage tracks in yards are of the same construction.

Our records showed that over a period of six years the average life of wheels was 36,000 miles. This low figure was due to the precautions taken to prevent derailments in operating cars on the tee rail. Wheels with low and chipped flanges were removed for fear of derailment on the tee rail while they could have been operated safely over the grooved rail in the city of Havana.

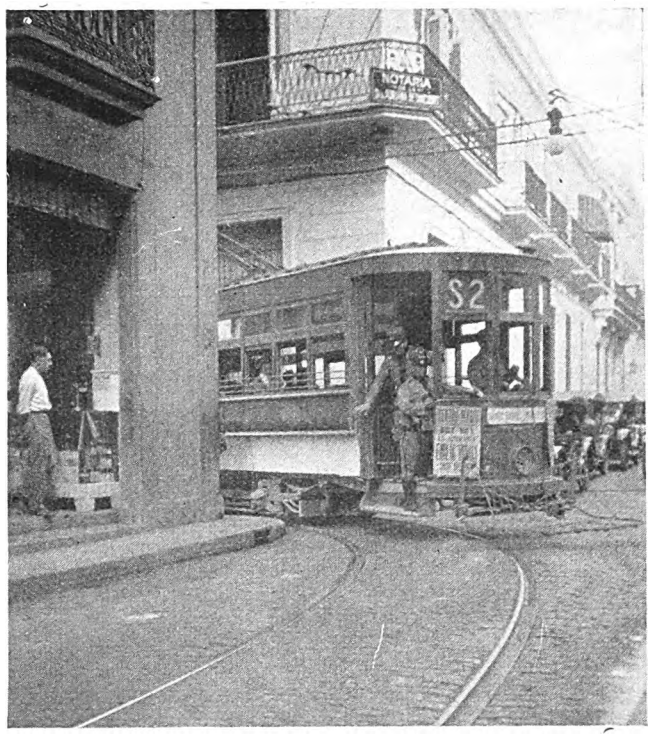
Various explanations were offered for this chipping. It was suggested that wheels were not properly installed on the axles. Sharp curves, improper alignment of track, rough spots due to rail welding, etc., were also suggested as possible sources of trouble. Probably all of these contributed to some extent. However, we found one of the chief difficulties to be that the bead of metal left on the top of the flange of non-chilled back flanges broke or chipped little by little when passing through crossovers or frogs and more so when passing through switches and mates. The chipping was found to be a detail process up to a certain point; then larger pieces of metal broke off, resulting in a condition that might cause a derailment in operation over tee rail.

To test our theory we placed a number of wheels in service with non-chilled back flanges that had this bead of metal ground off, taking care during the grinding to prevent undue heating which would soften the chill. The average mileage obtained from these wheels was 42,000 miles.

Manufacturers have now developed the chilled-back flange wheel, claiming for it that the change in grain of the metal increases the average mileage per wheel. We believe this to be true, although the change in the grain is not the principal cause. It is rather that the extension of the chill blocks when molding causes the slight bead of metal formerly left on the top of the flange to be left on the outside, so that the contour of the flange at the point of contact with the flange-bearing switches, mates and crossovers is left in a perfect condition, almost as if it had been turned in a lathe.

Despite this improvement we have continued to experience a certain amount of trouble from chipped flanges, and we have come to the conclusion that it is not fair to expect even a perfect flange of a cast-iron chilled wheel, with its brittle metal, to support a car and its passenger load when passing through and over flange-bearing switches, mates and crossovers, though the period of such strain is only of momentary duration. The tread of the wheel was designed to carry the load. Men were not intended to walk on their toes. How long could men do this stunt without a breakdown?

If cast-iron wheels give a greater return on the investment than steel wheels, then we must eliminate the flange-bearing switches, mates and crossovers.



Single-truck cars and sharp curves are typical of electric railway operation in Havana

Flexible Rail Joint Tried at Providence

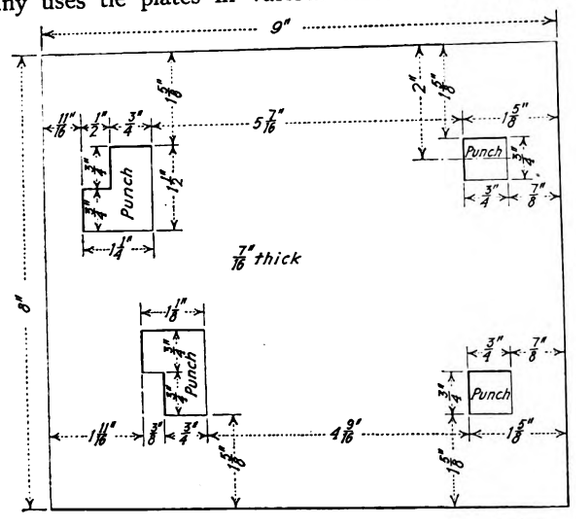
EXPERIMENTS are being made by the United Electric Railways of Providence, R. I., to determine whether or not advantages can be obtained by the use of a welded rail joint differing in principle from those commonly used. The design of this joint, known as the Moisselle joint, provides a round bar which is welded to the rail heads and which has a U-shaped bend opposite the rail ends, making the joint flexible rather than rigid. About a year and a half ago, 175 of these joints were installed on various rail sections including 9-in. girder, 8-in. high T, and 66-lb., 70-lb. and 75-lb. T rail. An inspection a year later showed a few partial failures which were attributed to the use of weld bars which were too small and to defective welding. The record of these joints was considered by H. W. Sanborn, chief engineer, to be good enough, however, to warrant a trial of 50 additional rail joints of the same type. Larger bars were used in the later installation. The features of the joint which particularly appealed to the management were its ease of installation, the absence of necessity for any mechanical fit in the fishing section and the flexibility due to the bend in the bar which is thought to eliminate the blow on the receiving rail and also to provide for expansion and contraction.

Digitized by Google

Combination Tie Plate for Various Rails*

By W. S. Yeats
Georgia Power Company, Atlanta, Ga.

TO OBTAIN the full life of a creosoted tie it is necessary to protect it from mechanical injury. If rails start to cut in, decay will follow and ties must be removed sooner than if they had been protected. To prevent this type of wear the Georgia Power Company uses tie plates in various sizes to fit the different rail widths which are found on the property. The tie plate used by the company has simplified the problems of the track foreman because it fits the bases of rail of 4½ in. to 6 in. width by ½ in. intervals. Either two or three spikes per plate may be used, and the form of the hole is such that the spikes are backed up by the plate. This tie plate has been used by the Georgia Power Company since 1923, during which time it has been entirely satisfactory.



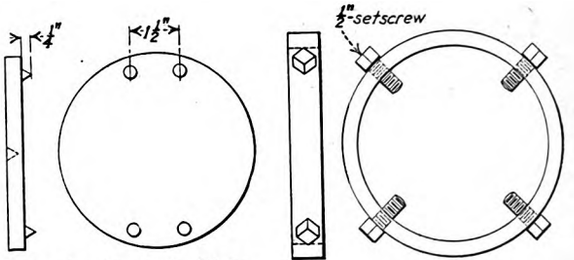
This tie plate used by the Georgia Power Company fits any rail base from 4½ in. to 6 in.

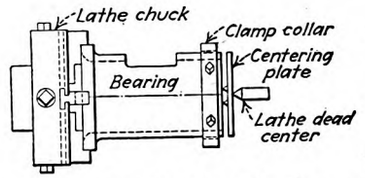
Axle and Armature Bearing Jig*

By Herbert Senior
Foreman Louisville Railway

FOR turning axle and armature bearings a special jig is used in the shops of the Louisville Railway. This consists of a bearing centering plate and a bearing clamp collar. When starting the operation it is necessary to face the bearing at the split surface, after which the bearing clamp collar is put on to hold the bearing halves together. When this is finished, the bearing is chucked and the tailstock is screwed against the center plate to force the four center pins in the bearing, as shown in the accompanying drawing.

When these operations have been performed the bearing clamp collar is released and is moved back over the tailstock. The bearing is then ready for turning with only one setting of the tool.





Jig used by Louisville Railway in turning down axle and armature bearings

All reclaimed bearings are welded on the two halves, after which they are spread over a mandrel 1/32 in. larger than standard size and then finished in the jig described. After the bearings have been turned on the outside to the required dimension, the outside of the collar and the inside of the bearing are finished to the required size.

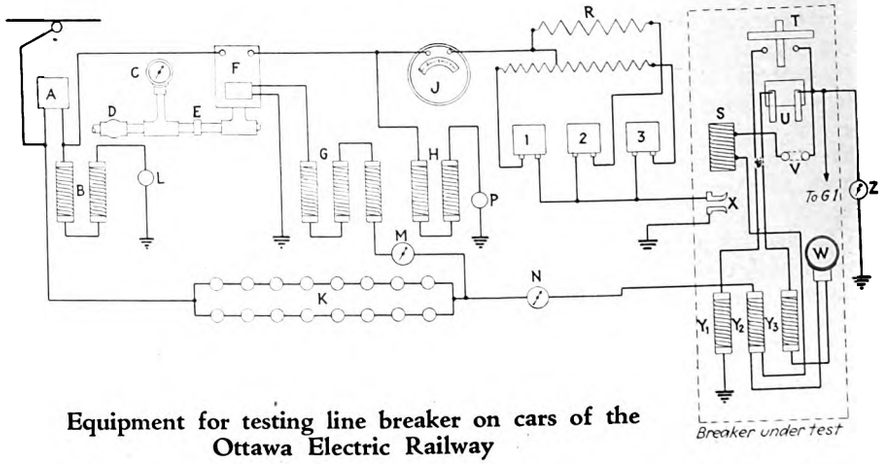
Testing Circuit Breakers in Place*

By R. W. James
*Electrical Department Ottawa Electric Railway
Ottawa, Canada*

IT HAS been found advantageous on the cars of the Ottawa Electric Railway to set the line switches and circuit breakers at definite points and then to seal them so that they cannot be tampered with, either by car operators or carhouse employees, without the knowledge of the line switch repairman.

To test and calibrate the line switches in place on the car, a testing set has been developed by the electrical department. This is installed in one of the pits in the

**Submitted in* Electric Railway Journal *Prize Contest.*



Equipment for testing line breaker on cars of the Ottawa Electric Railway

A—Mechanical circuit breaker;
B—Resistance, 1440 ohms;
C—Air pressure gage;
D—Air valve;
E—Air pipe insulator;
F—Unit switch, type 806-J-7;
G—Resistance, 2160 ohms;
H—Resistance, 1440 ohms;
J—Ammeter;
K—Lamp resistance;
L—Red lamp, 50 volts;
M—Control switch, 10 amp.;
N—Control switch, 10 amp.;
P—Red lamp, 50 volts;
Q—Connection to G-1 in controller;
R—Grid resistor; Type 801-E-4 switch to be set
S—Operating coil;
T—Interlock;
U—Overload fingers;
V—Carbon contacts;
W—Holding coil;
X—Contact tips;
Y1, Y2, Y3—Resistances, 720 ohms each.
Z—Control switch, 10 amp.

Digitized by Google

repair shop. The car on which the breaker has to be tested is run on the pit track and the breaker is connected into the test circuit by means of short leads. Connections of the testing set are shown in the diagram. *A* is a mechanical circuit breaker and *F* a line switch of the 806-J-7 air-operated unit switch type. The rheostat *R*, which consists of two sets of grids, 63 small and 63 large, can be connected in various combinations by the canopy switches 1, 2 and 3, the corresponding currents being indicated on the ammeter *J*. The switch to be tested, which is of the Westinghouse 801-E-4 type, is connected into the circuit as indicated. The magnet valve of switch *F* is energized by current passing through two sets, when switch *M* is closed, each of seven 85-volt lamps in series, shown at *A* in the diagram. The operating coil *S* of the line switch under test is energized through the same set of lamps by closing switch *N*. When the line switch is under test the short-circulating bar across the carbon contacts *V* is removed, the current goes through holding coil *W*, resistance *Y3*, and the left-hand overload finger *U*. It then follows across the short-circuiting bar to the corresponding overload finger and then to ground through the *G-1* connection. This allows a test corresponding to the first notch of the controller. On all other notches, holding coil *W* is not needed, because the control circuit is open when there is an overload and cannot be closed again until the controller is put back to the first notch, which permits the current to go to ground through *G-1*.

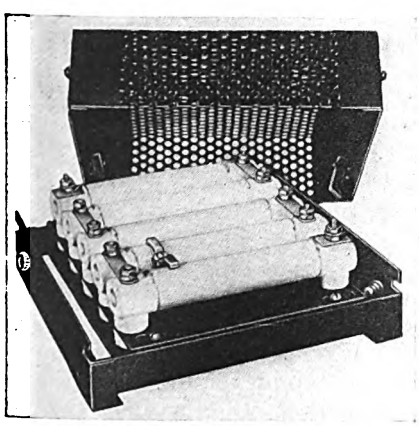
To test a switch breaker, switch *A* is first closed and air at approximately 70 lb. admitted through valve *D*. The desired combination of resistances is made by closing switches 1, 2 or 3. Control switch *M* is then closed, in turn closing switch *F*. Control *N* can then be closed, actuating the switch under test. To test a switch with the holding coil on the first notch, control switch *Z* is closed, after which it may be opened for testing on two or more speeds.

In this manner a switch can be tested on the car under road conditions. In addition to testing and setting line switches, this set is also useful in detecting various forms of trouble which otherwise would be difficult to locate.

New Products for the Railways' Use

Improved Headlight Resistance

GREATER efficiency of the individual units and easier maintenance are advantages claimed for a new headlight resistance recently placed on the market by the Ohio Brass Company. The units are of the exposed wire type instead of having covered wire, thus



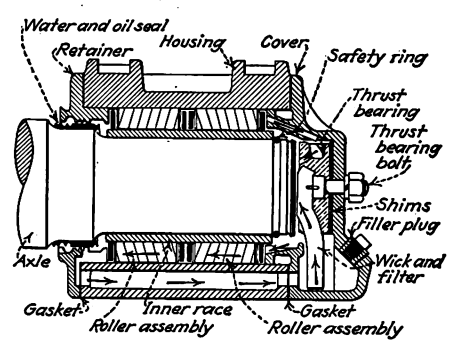
Removable unit headlight resistance is adjustable for voltage variation

permitting a much higher operating temperature. The wire is of nickel-chromium composition which eliminates rust, corrosion or brittleness brought about through long use. The tubes supporting the wires are threaded to eliminate possible shorting of a part of the coil. These tubes are arranged side by side to afford maximum opportunity for heat radiation. Ventilation is aided by two baffles mounted on top of the resistance, forming a duct for air circulation.

In order to make up for possible variations in line voltage, a sliding shunt is attached to two adjacent tubes by which the desired amount of current is delivered to the lamp. There are no exposed operating parts in the new resistance, and the cover may be readily removed without danger of losing the holding ratchets, which are securely fastened to the base. In place of the "pig tails" that were formerly used as connections, the new units are joined with brass strips which have completely overcome sagging and the resultant danger of grounded contacts.

Novel Lubricating System for Roller Bearings

SIMPLICITY of construction marks the new Fafnir-Melcher roller bearing for railway journals. A sleeve comprising the inner race, a roller assembly, and an outer housing in which the roller path is integral, are the three main parts. The sleeve, being shrunk or pressed on the axle, furnishes a hard and wear-resisting surface for the operation of the rollers. Alignment and flexibility are provided for in the design of the box. The rollers need take only radial load as all lateral thrust is absorbed by bronze thrust bearings, which, due to efficient lubrication, have a life equal to any other part of the bearing. The housing or box itself is composed of three parts: the front cover, containing the oil seal grooves and dust guard; the center member, in which is embodied the roller path equalizer seat and the pedestal flanges, and the oil reservoir.



Lubrication system of Fafnir-Melcher bearing—from well through wick to journal, to roller path and back to reservoir

A special alloy is used for this center member, and the roller path is heat-treated and ground to a minimum tolerance, thus assuring accurate fits, concentricity, and a wearing surface equal to or better than that of the separate outer race type. An advantage of this construction is the greater wall thickness permitted, which naturally increases the strength of the box, but still remains within A.E.R.A. standard pedestal dimensions.

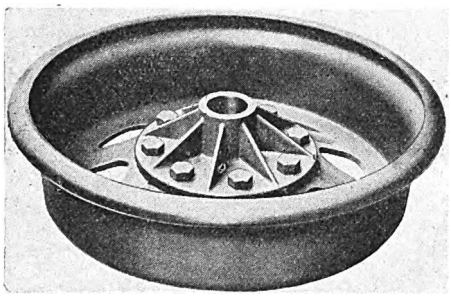
The assembly consists of two sets

Digitized by Google

of flexible rollers each contained in a spacer bar cage. The separator bars between each of the rollers permit better lubrication, as well as positive alignment of the individual rollers at all times. A feature of the bearing is the circulating and filtering lubricating system, which provides a constant circulation or flow of from 15 to 30 drops of filtered oil per minute through the bearing. The important element is a wick which draws oil from the reservoir to the axle, from whence by centrifugal action it is carried to the roller path, through the rollers and back to the well again.

Demountable Wheel for Rail Cars

WITH the new Fairmont demountable wheel for rail cars, it is possible, instead of discarding the whole wheel when a tire wears out, simply to remove eight $\frac{5}{8}$-in. nuts and press on a steel wheel blank or tire, which is bolted to the hub and remains permanently in position on the axle. The bolt circle is $6\frac{3}{8}$ in. instead of the usual 5 in. Stout parkerized lock washers secure the nuts. As the Fairmont hub is not pulled from the



Fairmont demountable wheel of 16-in. rim can be exchanged rapidly if worn out

axle, no time is lost in refitting spoiled insulation. There is no regaging and re-aligning of wheels every time a tire wears out.

The bolted hub makes it possible for the car operator to keep his car safe by tightening the nut with an ordinary wrench, if any bolt loosens. With riveted hubs, no tightening is possible, and there is always a temptation for the car operator to continue to use the car until such time as it is more convenient to change the dangerous wheel which has loose hub rivets.

Since but two sizes of rims (16-in. and 20-in.) need be carried, and these fit every hub on the line regardless of axle size or taper, a maximum stock of 50 tires is ample, where hundreds of complete wheels were formerly stocked. After all cars are once equipped with bolted hubs, a hub stock of one or two of each size is ample, for the tight hubs are subject to practically no wear. Fairmont tires are furnished in both $\frac{1}{4}$-in. and $\frac{5}{16}$-in. plate, and nest handily in vertical stacks. A large wheel stock can thus be kept in one small room, and the few reserve hubs can be kept in small bins.

The application of Fairmont hubs, which are furnished in any size and taper of bore, reduces the wheel stock for all cars to two tire sizes (or four items if both $\frac{1}{4}$-in. and $\frac{5}{16}$-in. tires are used).

Light-Weight Spray-Painting Outfit

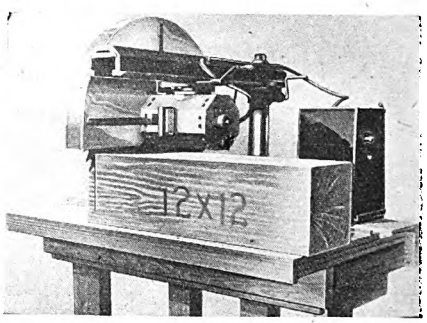
CONVENIENT portable apparatus for light-duty spray painting has recently been put on the market by the De Vilbiss Company. The light weight and compact size of this outfit make it extremely handy. The specially designed air compressor, and $\frac{1}{3}$-hp. universal electric motor which drives it, weigh only $5\frac{1}{4}$ lb. The spray gun weighs only $1\frac{1}{4}$ lb. and is said not to tire the arm even with long-continued use.

This apparatus has special features which are said to give it large capacity and unusual efficiency. The high air pressure produced by the powerful little motor and the design of the pressure-feed spray gun produce a complete, fine atomization of the material and assure the same good results achieved by big capacity outfits. Easy adjustments of the air cap of the gun enable the operator to atomize perfectly any of the various paints, lacquers or material that may be in use.

Two air caps give a choice of round spray or a full fan spray several inches wide. The pint size glass container has standard Mason jar thread. Ordinary Mason jars can be used for extra containers. The gun body and compressor housing are of high-grade aluminum alloy. Nozzle caps, fluid tip, valves and other parts are of brass, nickel-plated and nicely finished. It is designed to plug into any 110-volt electric socket. The complete unit consists of the Type GT spray gun, rotary compressor with switch, 15 ft. of air hose, and connections, 10-ft. extension cord and plug, and brass wire for cleaning.

Heavy-Duty Circular Saw for Track Work

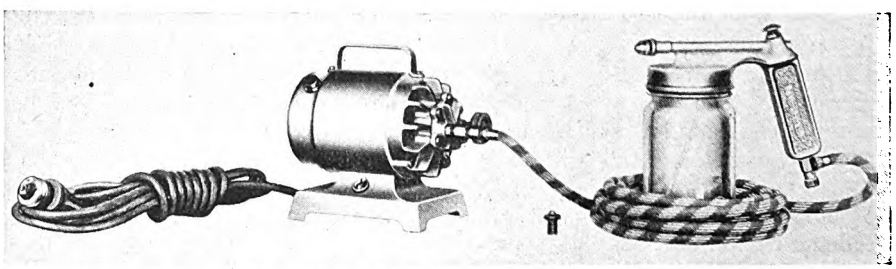
TO FACILITATE the cutting of heavy timber the De Walt Products Corporation of Lancaster, Pennsylvania, has developed a heavy-duty electrically driven circular saw. One man can operate this machine, feeding the saw with a hand ratchet gear feed or by chain feed on the arm of the machine. This arm may be



Heavy-duty cutting machine, Type L, handles timber of 12x12 in.

raised or lowered to depths of cut. Saw blades up to 36 in. are provided to handle 12-in.x20-in. material. The saw blade operates at 1,750 r.p.m. and is direct-driven by motor operated on either alternating or direct current in 220 to 550 volts.

This machine comes in two sizes, Models L and T, the capacity of the L type being 12x12 in. material, while the capacity of the T type is 12x20 in. The larger type is mounted on a metal table equipped with all-steel conveyor rollers for easy handling. The elevating device is operated by a wheel in front of the table which gives rapid elevation and ease in operation.



Light-weight spray-painting outfit manufactured by the De Vilbiss Company

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Detroit, Mich. — Mayor Bowles has requested the Street Railway Commission to make an immediate survey to determine whether rate of fare on the municipal railway should be increased.

✦

Philadelphia, Pa.—In a round-up by the police against illegal parking, begun on Jan. 23, 77 cars were towed to four designated garages, where they were impounded until owners paid $5 towing charges and $1 storage fee. Fifty motorists reclaimed their cars by paying a total of $300. Inspector Wasing was in charge of the war on parking. He led 25 patrolmen and eight towing trucks through the central streets.

✦

Chicago, Ill.—Master in Chancery Mason has again continued the hearing involving a petition by the Chicago Rapid Transit Company for a permanent injunction to restrain the Illniois Commerce Commission from interfering with the straight 10-cent fare. The new date is Feb. 20. The continuance was at the request of representatives of the city.

✦

Baltimore, Md.—Officials of the Baltimore city law department are studying the United States Supreme Court's decision in the United Railways & Electric Company rate case. The city has been more or less of a silent observer recently so far as the United Railways' rate matters have gone.

✦

Dallas, Tex.—The Dallas Railway & Terminal Company increased its surplus reserves by $109,716 during 1929. This was $55,912 more than accrued to this fund during 1928. The surplus reserve accumulates only after the company is able to spend or put aside a fixed percentage of its gross revenues in repair, maintenance and depreciation reserves and then pay a 7 per cent return on property value. The gross earnings of 1929 were $3,319,132 with operating expenses of $2,329,455.

✦

Washington, D. C.—In the District Supreme Court, Justice Wheat has denied the motion of the Public Service Commission for dismissal of the appeal of the Washington Railway & Electric Company and the Capital Traction Company from the commission's order denying them an increase in fare.

✦

Aberdeen, Wash. — Two cars of the Grays Harbor Railway & Light Company have been repainted in a shade of orange enamel developed after years of experiment to secure a color easily visible in fog or rain but durable under the conditions here. This color, adopted as standard, contains less red than that formerly used. All cars on the system will be repainted as rapidly as possible.

(*Late News Continued on Page* 112)

Philadelphia Wrought Up Over Transit Tangle

The Suit in Equity Brought by the City Results in Lively Sessions and Sensational Comment—A New Deal Is Likely

EARLY in January hearings were begun before presiding Judge Harry S. McDevitt in Common Pleas Court in Philadelphia in the equity suit brought by City Comptroller Will B. Hadley against the Mitten corporations, not only demanding a complete audit but asking for the end of Mitten Management's control of the transit system. After a few sessions the court observed that things were "going from bad to worse" and the result was that the equity suit hearings were transformed into a series of round-table conferences which, as indicated in ELECTRIC RAILWAY JOURNAL NEWS for Jan. 25, may mark the birth of a new transit policy for the city.

Behind closed doors in Judge McDevitt's court room Mayor Mackey, Deputy Comptroller S. Davis Wilson and representatives of the City Council and the Mitten interests decided that four transit experts, one each for the four persons or groups represented, would be designated to formulate recommendations as to the future of the transportation system.

NEW RELATIONSHIP MAY RESULT

The way was thus opened for a readjusted relationship of the city and the rapid transit company that may involve the municipal condemnation of the entire transit system, the ousting of the Mitten interests as managers and the appointment of a new managerial organization. Certainly the developments are attracting wide attention, so much so that they have been made the topic of a special article in the New York *Times* by Lawrence Davies This observer even goes so far as to say that despite denials from one or two of the concerns mentioned in the speculation, suggestions in political and financial quarters that the move for a "re-deal" has the backing of interested banking and public utility corporations eager to gain a foothold in the Philadelphia transportation field have won credence in the last few days.

The early days of the equity suit were spent in the bickering of opposing counsel in revealing intricate phases of the financial relationships among the Philadelphia Rapid Transit Company, Mitten Management, Inc., Mitten Bank, Mitten Bank Securities Corporation and other Mitten interests, including charges that Thomas E. Mitten and his son and successor, Dr. A. A. Mitten, were sole owners of the stock of Mitten Management, Inc., which collected an annual fee of $1,100,000 for P.R.T. operation; in adducing from the city's representatives on the P.R.T. board, Joseph S. McCulloch and Ernest T. Trigg, that they knew little of the company's operations, especially as to its financial transactions; and in warnings from the judge that the case must be tried in court and not in the newspapers.

This last admonition followed the release to the newspapers of the city's answer in the suit before Deputy Comptroller Wilson, its chief of counsel, had turned the papers over to the court. After Mitten lawyers had described the answer as "vitriolic, defamatory, malicious and scandalous" Judge McDevitt received Mr. Wilson's apology and ordered him to file an amended paper with the "vitriolic comment" deleted.

Ellis Ames Ballard and associated counsel for the Mitten interests have taken the position that although the late Thomas E. Mitten dominated the transit company's affairs, his domination had brought the P.R.T. operation to "as high a plane of excellence as that attained by any surface street railway in any metropolitan area in the United States, and that the relations existing between the men and management had been brought to a degree of harmony unsurpassed in any other community." They have contended that the regulatory power and jurisdiction over the P.R.T. methods and classification of its accounts rests exclusively with the Public Service Commission.

The hearings have had their amusing incidents as well as the revelations that produced headlines for the Philadelphia papers. Deputy Comptroller Wilson, although not a full-fledged member of the bar, was authorized to prosecute the suit, but was assisted by Assistant City Solicitor John J. Elcock. Mr. Elcock one day protested to Judge McDevitt that Mr. Wilson paid no attention to him. All he had to do was to sit and twiddle his thumbs. The judge bade him find a comfortable seat and cease worrying about his inactivity, for "the public understands the situation."

Former Senator George Wharton Pepper, former Judge James Gay Gordon and other prominent lawyers associated with the Mitten side, have been by turns enraged, exasperated and caustically tolerant of Mr. Wilson's prosecution methods. That these methods have been unorthodox even the critical Philadelphia *Record* has been forced to admit. Of him that paper felt required

(*Continued on Page* 114)

Digitized by Google

LATE NEWS

(*Continued from Page* 111)

New Orleans, La.—For the first time since the beginning of the beautification work on Canal Street, which necessitated the rerouting of cars of the New Orleans Public Service, Inc., six lines using tracks in this street resumed operations there on Jan. 19. The new rerouting is expected to facilitate the movement of traffic in Canal Street, lessen congestion, and speed up the railway service.

✦

New York, N. Y.—The Regional Plan Committee made public on Jan. 25 the detailed studies of its engineering staff on the subject of the Brooklyn and Queens approaches to the projected 38th Street-East River vehicular tunnel. They have an important bearing on the recently announced proposal of the New York and New Jersey tunnel commissions for a highway connection between Long Island and Weehawken, N. J. Several months were required by the engineers for their studies.

✦

Kennebec, Me. — Directors of the Androscoggin & Kennebec Railway deferred payment of the dividend due Dec. 1, 1929, on the company's 6 per cent cumulative preferred stock.

✦

Dayton, Ohio — The Cincinnati & Lake Erie Railroad has formed an honor club for employees of its predecessor companies who have seen continuous service of 25 years or more. At the organization banquet on Jan. 22, 39 employees, eligible for membership, attended. Each of the men was commended by Dr. Thomas Conway, Jr., president of the railroad.

✦

Philadelphia, Pa.—Backers of the project of a competitive taxicab service have appealed to the Superior Court against the ruling of the Public Service Commission assuming to grant a monopoly in this field to Philadelphia Rapid Transit and Mitten Management. The position of the commission in its ruling was that "the time has come when regulated monopoly is the best means of taxicab operation."

✦

Washington, D. C.—The Parker bill, for regulation of buses operating in interstate commerce, was considered in executive session on Jan. 24 by the interstate commerce committee of the House, The committee voted in favor of the provision requiring certificates of public necessity and convenience before any buses are permitted to operate in interstate commerce. It is said that the bill will be reported favorably to the House very soon.

✦

New York, N. Y.—At a meeting of the Board of Estimate on Jan. 24 at which the matter of granting a franchise for a bus line in Brownsville, Brooklyn, to the Eastern Parkway, Brownsville & East New York Transit Relief Association came up, Mayor Walker announced that consideration of the franchise would be deferred until April 25, asserting that the city was not in the mood for granting a franchise to this or any other company until the Legislature had disposed of his bill, now pending, which would provide unified bus transportation.

Geneva, N. Y.—The Public Service Commission has approved the assignment by the Geneva Railway Bus Lines, Inc., to the Colonial Motor Coach Corporation of the certificate granted by the commission to the Geneva company on Jan. 29, 1929. The certificate covers the bus line running from Geneva to Seneca Falls. The commission has also approved an amendment to the certificate calling for operation over other streets than those named in the original consent by the city.

✦

Seattle, Wash.—Salesmanship on the part of trainmen and others that will resell street car and city bus service to those who have been gradually withdrawing their patronage from the Municipal Railway during the last few years, has been demanded by George B. Avery, superintendent of public utilities.

✦

Boston, Mass.—The Boston Elevated Railway is advertising in display space in the daily papers its success as a competitor in the Brady Award contest, in which, in its class, the company was declared to have done most "to conserve the safety and health of the public and its employees," in 1928.

✦

Detroit, Mich.—The Detroit & Port Huron Shore Line Railway, the Rapid Railway and the Port Huron City Electric Railway have been sold at public auction to Roger I. Marquis and Augustus C. Ledyard, representing the bondholders protective association, on their bid of $300,000. There were no other bids. The sale is subject to confirmation of Judge Charles C. Simmons of the federal court.

✦

Atlanta, Ga.—A new issue of Georgia Power Company $6 preferred stock was placed on the market Jan. 1. This stock is offered for sale at $100 per share plus accrued dividends, both for cash and on a partial payment plan. It is cumulative and is redeemable at $110 per share plus accrued dividend. Employees are being paid a special commission of $1 per share for selling this stock.

✦

Bloomington, Ill.—The Illinois Power & Light Corporation has formally accepted the new twenty-year franchise with terms practically the same as those of the preceding contract, except that wider latitude is given to the company in the establishment of bus lines to supplant railway lines.

✦

Syracuse, N. Y.—The committee representing the New York State Railways 50-year first consolidated mortgage bonds series "A" and "B" has announced an extension of time for the deposit of the bonds to Feb. 18, 1930. Receivers for the New York State Railways were appointed on Dec. 30, 1929, by the United States District Court for the Northern District of New York and they are now operating the properties.

✦

New Orleans, La. — Records up to Jan. 2 show the bombing of 64 trolley cars of the New Orleans Public Service, Inc., since the strike of union crews last July.

Evansville, Ind. — The Evansville & Ohio Valley Railway, operating a railway to Rockport and Grandview, Ind., and bus lines to Mount Vernon, Ind., Tell City and Cannelton, Ind., and Henderson and Owensboro, Ky., is advertising its business intensively in the Evansville and Owensboro newspapers. According to Ray Millican, general manager, the new year has started well with the company's passenger and freight business showing a nice increase over the corresponding period last year.

✦

St. Louis, Mo.—Murray J. Douglas and L. A. Graeser, former president and secretary, respectively, of the St. Louis local of the Amalgamated Association, as trustees of the Sick Benefit Association of the union are suing the Union Labor Insurance Agency and the Southern Surety Company to reinstate a contract for a sick and accident insurance for members of the union cancelled last October by the Southern Surety as improperly drawn. All claims prior to the cancellation of the contract were paid in full. The court is asked to compel the Southern Surety to pay all the claims that have come up since the cancellation.

✦

Hartford, Conn. — The Connecticut Company discontinued its High Street bus line on Jan. 26 under authority of the Public Utilities Commission, which accepted the declaration of the company that the route was unprofitable. Frequent transportation over alternative routes, the commission believes, compensates for less frequent transportation afforded by the High Street service.

✦

Washington, D. C.—The Washington Railway & Electric Company and the Capital Traction Company on Jan. 21 voiced their objections to Congress to the proposal for their merger sent to the Capitol by the Public Utilities Commission.

✦

Alameda, Cal.—Arrangements have been practically completed between the city and the Key System Transit Company, whereby the Key System will use for trolley support the new electroliers to be installed on Park Street in Alameda between Clement Street and San Jose Avenue. Present plans call for the removal of all Key System trolley poles on this portion of Park Street. Trolley wires will be fastened directly to the electroliers.

✦

Philadelphia, Pa. — The Council's transportation committee has selected Roosevelt boulevard as the route for the construction of a $30,000,000 high-speed feeder line to the Broad Street Subway. The new subway will extend from Broad Street and Hunting Park Avenue along the boulevard to Pennypack Circle. The committee has also recommended that the Council employ Sol M. Schwab, former city consulting engineer, as a transit expert to advise the legislative body in negotiations with P. R. T. for a new operating arrangement on the North Broad Street Subway. In addition the committee has approved an enabling ordinance appropriating $7,000,000 for relocating the Market Street Subway's elevated tracks under the Schuylkill River and authorizing the director of transit to advertise for proposals and enter into necessary contracts.

Digitized by Google

More Than $5,000 a Day from Third Avenue Buses

Receipts of the Third Avenue Railway, New York, from bus operation are between $5,000 and $6,000 a day. These bus receipts are not included in the receipts of the railway system, only the net from bus operation appearing in the income statement. During the past year there were extraordinary expenses due to the installation of new lines and equipment. The buses are being depreciated on the basis of a five-year life which takes care of the equipment notes issued for a larger part of the buses. Under these conditions, the bus operation showed a deficit of $287,775 for the year. It is believed that in a very short time the bus operation of the system will show profitable present operation with great possibilities for the future. President Huff says:

"The threat of the destruction of trolley lines by bus competition has disappeared. The bus lines now in operation have been laid out in the main to feed and supplement existing trolley lines. It has been a long, tedious process of education both of ourselves and the communities in which we operate in arriving at fair and reasonable conditions of operation. We have had many municipal authorities to deal with in Westchester County, and it has taken time to reach a fair basis for carrying on a business that of necessity has to look somewhat to the future for its rewards."

Adding to Income with Package Service

The Lehigh Valley Transit Company, Allentown, Pa., has instituted a package service upon its Liberty Bell limited cars, which cover the 60 miles between Allentown and Philadelphia. Frequent requests have been made by firms with small parcels requiring quick delivery to Philadelphia and way points, to have the crews perform this service. It has not been a question of money; the requirement was fast delivery. Space was available in the motorman's cabin to transport a considerable number of packages without any inconvenience. The railway, therefore, announced that baggage tickets costing 50 cents could be secured. The packages or parcels are delivered by the sender at any of the baggage rooms along the route. Here they are loaded upon the cars, and dropped off at the various stops requested. Packages must be under 50 lb. in weight and must not exceed 4 cu.ft. in capacity.

More Maneuvering in Chicago

The Chicago City Council's local transportation committee on Jan. 27 unanimously voted an expenditure of $30,000 from the traction fund for the preparation of actual plans and specifications for a State Street subway. The specifications will be written into an ordinance for the construction of the subway by special assessment, with property owners sharing the cost with the city.

At this same meeting John Maynard Harlan, attorney for an Eastern group seeking a franchise, charged that the committee of bankers appointed by Samuel Insull does not really exist, that A. W. Harris has never accepted his appointment, and that the committee would have difficulty in showing that it has ever met.

The Aldermen discussed and shelved for three weeks Alderman Guernsey's request that March 15 or April 1 be set as a date on which franchise contenders should submit transit ordinances. This was done because the sub-committee is working on an ordinance draft with the surface and elevated lines. Alderman Guernsey's plan for a subway in solid rock 125 ft. below street level was turned over to the engineers for study.

On Jan. 21 the Chicago City Council's transportation sub-committee submitted a dozen changes which it has made in the new co-ordination ordinance to Attorney Walter L. Fisher, legal representative of Federal Judge James H. Wilkerson. The changes are all technical and tend to strengthen the city's position. If they pass Attorney Fisher, the changes will then be submitted to the local transportation companies and to the citizens' committee.

No Propaganda in Boston Broadcasts

Radio broadcasts started by the Boston Elevated Railway, Boston, Mass., to stimulate patronage and increase good will toward the road have caused Representative Sullivan, of Dorchester, to protest to Governor Allen, asserting the broadcasts were being utilized to urge continuance of public control.

Chairman Harriman of the trustees of the company has replied that the purpose of the broadcasts was simple and direct, namely, to attract more riders to the system. He said in part:

"In recent years the trustees have appropriated moderate sums for advertising to stimulate riding. The radio broadcast is in line with this effort. We believe that the objects sought are all within the scope of legitimate advertising, that the returns will be commensurate with the small expenditure and that the effort indicates a management alert to the requirements of present business methods.

"It is not the intention of the trustees now or later to attempt in any way to influence the public mind with respect to the future organization of the Boston Elevated Railway. We intend simply to tell the facts with regard to the service as they are today and explain how the road has been operated under public control."

Mr. Harriman attached a list of electric railways using the radio for advertising purposes and an article from *Aera* explaining its use in this connection.

Ancillary Receivers for New York State Railways

Judge Adler in the United States District Court in Buffalo, N. Y., has appointed William T. Plumb and Benjamin E. Tilton as ancillary receivers for the properties of the New York State Railways following an equity receivership action against the company brought by the General Finance Corporation, Utica. Judge Adler instructed them to continue the lines in operation and submit a detailed report of the condition of the company. The receivership order enjoins all creditor interests from instituting court actions against the receivers on past due claims.

Storm Hits Portland, Me.

Electric railway service at Portland, Me., was hampered severely during the week ended Dec. 21 by the double sleet storm which cut off all incoming power service and threw the lighting, power and railway load upon the Cape steam plant of the Cumberland County Power & Light Company. "At no time was trolley service completely disrupted in Portland," said Fred D. Gordon, vice-president and general manager, to a representative of the ELECTRIC RAILWAY JOURNAL.

Obstacles to Electric Railway Service in Portland

Digitized by Google

De Luxe Service in Cleveland Popular

The permit for the 25-cent express motor coach service started by the Cleveland Railway between Cleveland and Cleveland Heights on Dec. 7 has been extended for six months by the Cleveland Heights Council. The original grant was for 30 days. Officers of the Cleveland Railway are pleased with the results, particularly as all the regular customers provided their own transportation to the business district prior to the time the express service was started and thus, in a small way, at least, the express service is an aid to railway service by helping to reduce traffic congestion.

The express coaches make fast time. The aim is to give every passenger a seat, but during the rush hours this is not always achieved.

The Heights line is the first regular express service the railway has been able to operate in the Cleveland district. Moreover, it is the first local transportation line furnishing service to the Van Sweringen's new union terminal and it provides the only direct service between the Van Sweringen terminal and the Pennsylvania's East 55th Street station.

Philadelphia Wrought Up Over Transit Tangle

(*Continued from Page* 111)

to say: "Yes, Mr. Wilson is an inflammatory and rather incalcuable factor in the transit controversy. He is impulsive, undisciplined, intractable. He ignores the traditions of the game and defies its rules. He is a perpetual insurgent, an implacable guerrilla; a shrill note of discord in the legalistic symphony; a bull in the equity china shop; a burr under the saddle of justice—pick your own metaphor. But he survives and he produces."

Included among the statements of Mr. Wilson which brought down upon his head the censure of the court were in substance the following:

"Control of P.R.T. by Mitten Management was obtained through the alluring offer to P.R.T. employees to give them stock therein through the bonus system. When these stocks aggregated majority control Mitten compelled the employees to turn over P.R.T. stock for securities in his private enterprises, illegally financed by P.R.T. funds . . . As the plan progressed Mitten Management would have become sole owner of P.R.T. without the investment of one dollar . . .

"P.R.T. men have never had a fair voice in the management and policies of P.R.T. Their bonus stocks were exchanged for stocks in Mitten enterprises. P.R.T. men became obligated to Mitten Management rather than to the public. . . .

". . . . a gesture of Mitten that he was founding an industrial democracy—of which, however, he was the autocratic and aggrandizing head, in the interest of himself and of the Mitten interests."

In a flaming editorial in which the *Record* asked whether after all Mr. Wilson hadn't performed a public service in showing that "there isn't any Santa Claus behind those Mitten Management whiskers," that paper admitted that "Mr. Wilson deserved his spanking as the Bad Boy of the transit litigation."

That of course is a striking instance of the extent to which the animosities have been carried. The important thing, however, is the constructive side of the picture. The round-table conferences were agreed upon after the deputy comptroller had suggested to the court the city's purchase at par of the outstanding $30,000,000 of P.R.T. common stock, the $14,000,000 of preferred stock and the $25,000,000 of bonded indebtedness, as well as the condemnation of the underlying companies for $80,000,000. This estimate would bring the total price to $149,000,000.

Mr. Wilson pointed out that elimination of Mitten Management would save a yearly fee of $1,100,000, and he figured that there would be saved also $8,000,000 which the company pays annually as underlier rentals and $2,400,000 in annual dividend requirements. He also declared the $800,000 paid yearly to P.R.T. officials was excessive.

Judge McDevitt in agreeing to the conference plan called attention to the division of transit system ownership among the city, the P.R.T. and the underlying companies. He said:

"The sooner we face the music and realize that somebody has got to take over all of this—and probably the city—and run it by competent management and executives the better off will all be. Now, if we can solve that problem and put the transit system where it belongs, pay a fair and reasonable price for it, and then permit the city to employ competent persons to operate it, you will be infinitely better off than you are having a contract with P.R.T. and they with Mitten Management and the Mitten Bank Securities Corporation and three or four other companies, where it is almost as impossible to unscramble them as it was to unscramble the railroads after the war. They have become so intertwined and interwoven now that I cannot put my finger on the line of demarcation in any of the evidence that has already been produced."

As Mr. Davies sees it, to many observers any agreement on terms for possible condemnation of the whole transit system seems far distant. Skepticism is the reigning state of mind. And in the meantime the clamor grows for speedy tunneling under the Schuylkill River in order to lay the West Philadelphia elevated tracks underground in preparation for the Pennsylvania Railroad improvements and for the extension of the city-owned Broad Street subway into the northeast section. In short, transit has become the urgent outstanding problem of the Mackey administration.

WATCH FOR

A.E.R.A. Transportation Committee's Illustrated Brochure Covering Three Special Trains

to the

San Francisco Convention

and

General Convention Information

To be mailed from

Association Headquarters Feb. 15

Company Makes Subway Operating Proposal

In the interim A. A. Mitten, chairman of the board of the Philadelphia Rapid Transit Company, in an open letter to Edwin R. Cox, president of the City Council, has made the following suggestions as a basis for consideration and discussion of the lease by the city of the Broad Street subway.

1. Up to such date as a new lease should be signed Philadelphia Rapid Transit will bear and absorb without reimbursement from the city the loss which stands today at over $800,000 and is being reduced at the rate of about $40,000 per month.
2. Philadelphia Rapid Transit will sign and urge upon the commission for its approval a new lease to run from year to year from the date of its execution which shall contain the following terms:
   (a) Philadelphia Rapid Transit as lessee to operate the subway as part of the unified system.
   (b) Philadelphia Rapid Transit to pay to the city monthly the net addition to its net revenues arising from Broad Street subway operation for the preceding month as reported by the board of ten, which board should be continued for this purpose.
   (c) In computing subway operating expenses the board shall include to cover general and management expenses 2 per cent of subway gross revenues; this because thus far the board has included nothing on this account.
   (d) In case for any reason, such as opening of subway extensions, the subway shall cause a loss in P.R.T. net revenue for one or more months, P.R.T. shall not be entitled to any repayment by the city, but such loss shall be made up from the increased revenues from subsequent months and thereafter P.R.T. payments to the city shall be resumed.
   (e) Such lease to run from year to year terminable by either party at the end of the first or any later year on three months prior written notice.

Mr. Mitten stated in the letter that loss in addition to rental to P.R.T. for the full fifteen months period of operation of the subway amounted to $826.603, although for the month of November, as for several other recent months, the subway has proved a slight financial benefit to the whole system.

That progress is being made at the round-table conferences is attested by the announcement made just before this issue of the JOURNAL went to press that the committee of four to which reference has been made will comprise Dr. Milo R. Maltbie, for the city comptroller; S. M. Swaab, consulting engineer, for the City Council; W. K. Myers for the P.R.T., and J. A. Emery for the Mayor. They have been instructed: (1) to make a survey of transit facilities; (2) to make a study of transit finances; (3) to make a survey of the underliers; (4) to analyze the city-company operating contract; (5) to recommend methods by which the situation can be worked out, and to estimate the results.

Digitized by Google

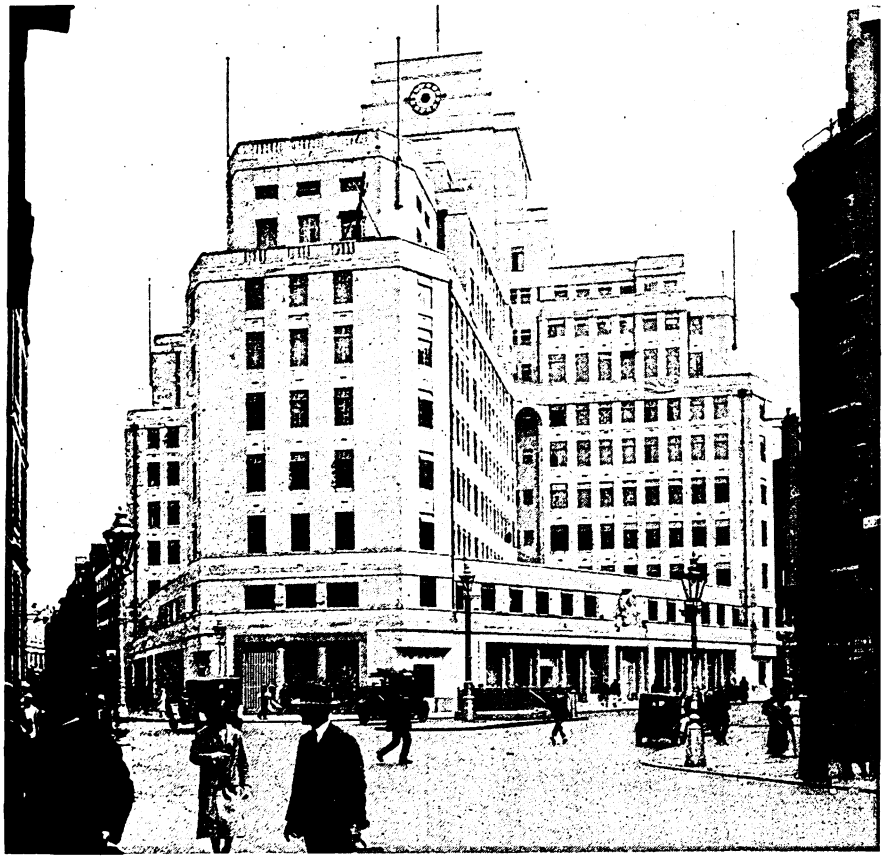
Underground Headquarters London's Highest Commercial Structure

The fine new headquarters of the London Underground Railways combine, constructed above St. James's Park Station and crowned with a floodlighted tower that is one of London's newest and most outstanding landmarks, is now in full use. The exterior of the building takes the form of a huge white Latin cross. It has been made familiar to the London public through the controversy which the Epstein sculptures aroused. The interior has no such suggestion of towering solidity. The impression is rather one of simplicity, softness, and polished cleanness.

The whole building gives a sense of utility and of a certain austerity without discomfort. It has its own water supply pumped from an artesian well 500 ft. below the ground level to tanks alongside the balconies of the tenth and top floor. Its electricity is drawn from Lot's Road power station of the Underground Company, and transformed to the required voltage in the basement. Here, too, are an automatic telephone exchange and a kitchen for the supply of afternoon tea to the 1,000 occupants of the offices. The business part of the building extends upwards only to the tenth floor, but above that rises the tower with a 60-ft. flagpole above it. This is both a landmark by day and by night. It affords a fine view to those who are privileged to ascend it.

Not being a virgin site, certain inherited difficulties presented themselves in the construction of the building. St. James's subway station and the contiguous railway ran across a portion of the site only a few feet below street level. The foundation of the building in this region had to be straddled over the subway and the framework stanchions based on cross girders some 54 ft. in length, bridging it. The girders themselves rested on group piles at each side of the railroad.

The building is the highest commercial structure in London.



Impressive structure which houses London Underground officers and staff

476 Miles to Be Electrified in Switzerland

The complete list of railway lines in Switzerland to be electrified within the next seven years is as follows:

Line	Length in Kilometers	When to Be Electrified
Neuchatel-Chaux-de-Fonds-Col-des-Roches	38	1930–31
Delemont-Basel	38	1930–31
Delemont-Delle	40	1931–32
Wallisellen - Uster - Rapperswil - Uznach-Ziegelbrucke	46	1931–32
Zurich-Affoltern-Zug	36	1931–32
Biel-Sonceboz-Chauz-de-Fonds	44	1932–33
Berne-Lucerne	84	1932–34
Rorschach-Buchs	49	1933–34
Gossau-Sulgen	23	1934–35
Neuchatel-les-Verrieres	35	1934–35
Sonceboz-Moutier	25	1935–36
Guibiasco-Locarno	18	1935–36
	476	

Sydney, Australia — Construction of Eastern Suburbs Electric Railway in New South Wales has been postponed owing to shortage of funds for new works.

Paris Subway Fusion Takes Effect

Amalgamation of the Metropolitan and the Nord-Sud railways of Paris gives Paris a unified subway system with more than 200 stations and approximately 70 miles of double track. There has always been a close working agreement between the two lines, with interchange of traffic. From the administrative and operating standpoints, however, useful economies may be expected. It has been reasonably claimed for Paris that, in proportion to its size and population, the city has a more closely-woven network of sub-surface railroads than any other city in the world, there being, roughly speaking, 1 mile of double-track underground railroad to every 42,857 of inhabitants. Yet in many respects comparison between the underground transport system of Paris and similar systems in other large cities cannot be justified, because at present, in the case of the French capital, all of the lines terminate at the city boundary. In the not distant future, however, this condition will be altered, for several lines which extend into the nearer suburbs are scheduled for early construction, and one is even now being built. There is also a larger project, which has been sanctioned by the Prefecture of the Seine, which will carry the lines still further afield, and thus bring Paris into line with large metropolitan centers elsewhere.

Rome, Italy—Rome is at last to have its metropolitan subway system, the decision having been made at a recent meeting of the Superior Council of Public Works. The system will, when completed, consist of three lines, called A, B, and C. Line A's total length will be between 6 and 7 miles. It will cost $16,500,000. Line B will be 3½ miles long. It will cost about $8,600,000. Line C will be nearly 5 miles long. It will cost $13,000,000. The project is particularly opportune at this moment, when it has been already decided to abolish the surface railways from the center of the city. With the abolition of the street cars, a so-called zone of silence is to be created in the center of the city.

✦

Manchester, England—Since bus traffic is eating into the tramway revenue the tramways committee has resolved to curtail the normal tram car building program and to reduce expenditure on tramway tracks. R. Stuart Pilcher, tramway manager, says that the number of tramway passengers during the year ended March 31, 1929, had decreased by more than 5,000,000 compared with the previous year, while the number of bus passengers had increased by about the same amount. Both undertakings are run by the municipality. Mr. Pilcher recommended improvement in the tramway rolling stock, both as to seating and lighting. In a bill which the Manchester Corporation is promoting it seeks authority to run buses beyond the city, to carry freight, to enter into working agreements with other local authorities and with companies in reference to buses, and to substitute trolley vehicles or buses for existing tramways. Some of these powers are covered by the Government's road traffic bill.

Digitized by Google

$112,000,000 in Subway Contracts in Year in New York

The New York City Board of Transportation awarded more than $112,000,000 in rapid transit construction contracts in 1929. Contracts for eleven sections of the new city subway system and for equipment, cars, motors, signals, tracks and stations needed for its operation accounted for $109,512,644 of this amount. The rest was allocated to work done on the B.-M.T. and I.R.T. systems under their contracts with the city.

About $140,000,000 worth of contracts will be let during 1930. It is expected that within a short time, with the letting of the contract for the new bridge over the Gowanus Canal, an entire trunk line of the city's new subway system, except for a short link connection to the recapturable B.-M.T. Culver line, will be under construction from Broadway and 215th Street in Manhattan to the ocean front in Coney Island. The Manhattan division is now nearing completion, the spring of 1931 having been set as the date for operation of the line from the Harlem River to Chambers Street.

According to the board the $5,000,000 car shops, storage and repair yards at 207th Street on the Harlem River water front will be finished before next spring.

Columbia Abandonment Case Before Supreme Court

The United States Supreme Court has consented to pass upon the suit between the state of South Carolina and the Columbia Railway Gas & Electric Company which originated over the suspension of railway operation in Columbia. The Supreme Court of South Carolina held that the franchise linked inseparably the operation of the electric street railway, light and power businesses—all public services—and that the railway service could not be separately abandoned. The company appealed to the Supreme Court from the decision of the state court. In their brief to the court requesting that the appeal be dismissed, the state and the city authorities contend that they have never held that a unit charter requires railway operation at a loss. They contend, however, that the company has not made an honest effort to make the service pay.

More Time Asked to Perfect Omaha Rerouting

Growing dissatisfaction with the rerouting of the Omaha & Council Bluffs Street Railway System as a result of a traffic survey conducted by Ross W. Harris, resulted in a well-attended City Council meeting on Jan. 20, open to the public. Pressure was brought to have the Council at a forthcoming meeting instruct the company to restore the routing in effect before Dec. 8.

President Shannahan requested that 90 days be allowed the company in which to make such changes as it found necessary to improve the new system, and also that the company's request for restricted parking on the main downtown streets during rush hours be granted. His request for the 90 days was denied, but the City Council passed an ordinance ordering only parallel parking on the main downtown thoroughfares during rush hours This ordinance is to become operative on Feb. 1. Mr. Shannahan said:

"In our opinion adequate and satisfactory service which will keep the present benefits can never be devised and supplied if changes are imposed upon the system each week. Attempts to give various groups of people exactly what they want, without reference to the rest of the system, will result eventually in no service to anybody."

His position was that if the public was not disposed to permit the company successfully to work out the rerouted system, the only alternative was to return to the old system.

Rearranging Parked Area on Broadway

W. G. Fullen, chairman of the New York Transit Commission, has proposed a plan for remodeling the park plots in Broadway, between Columbus Circle and 120th Street, to provide for inside entrance and exit on Broadway surface cars and elimination of the hazard to passengers presented by vehicular traffic in that thoroughfare. Police stanchions, forming safety zones for use of surface car passengers, have been found to afford inadequate protection. The Transit Commission would cut down the park space in the centre of the roadway, with sidewalks 4½ ft. wide installed on either side. Rearrangement of the doors on the surface cars, which officials of the Third Avenue Railway have agreed to make, will provide entrance and exit facilities on the "off" side. This new arrangement would permit several cars to stop in one block to take on and discharge passengers.

Company Rejects Proposed Jacksonville Franchise

Formal rejection by the Jacksonville Traction Company, Jacksonville, Fla., of the Miller draft of the proposed new franchise has been announced by J. P. Ingle, manager of the company. Mr. Ingle said in part:

"The operations of this company for the year ended Sept. 30, 1929, resulted in a deficit of more than $60,000 after interest charges on its debt. No dividends have been paid on the preferred stock since 1916 and none on the common stock since 1914. With the first mortgage bonds of the company maturing March 1, 1931, and its present franchise expiring Jan. 15, 1932, and with the present earnings, it will be impossible to provide new money to pay these bonds at maturity or to pay for improvements. Recognizing this situation, the company has sought honestly and earnestly for a new franchise fair to it and to the city.

"The franchise recently prepared by the city attorney is even more burdensome than the present one. Under the proposed terms the company could not survive.

"We desire earnestly to co-operate with you in a fair solution of the situation and will welcome an opportunity to negotiate with you on such a basis. We are convinced, however, that no solution could be reached on any terms even approaching those in the proposed franchise and we therefore feel that an attempt to arrive at a workable franchise from such a base would be of no avail.

"We hope sincerely that you will recognize the justice of our position and order a new draft prepared which will make possible the object we both wish to accomplish, namely, adequate service to the public on a fair basis."

Attractive Transportation Guide to Binghamton

The first issue of the "Triple Cities Transportation Guide," published by the Triple Cities Traction Company, Binghamton, N. Y., has been mailed to more than 40,000 persons and concerns in the community, through the co-operation of the Binghamton Light, Heat & Power Company. In an introductory statement, attention is invited to the fact that the company serves a community of 130,000 population, has 50 miles of trolley tracks, operates buses over routes aggregating 30 miles, and has a universal transfer system which allows patrons to complete their journeys by bus or trolley without additional cost. The guide lists all trolley and bus lines, with their transfer points, and gives time schedules. The last page of the folder carries a half-tone reproduction of a photograph of the first electric car in Binghamton, taken in July, 1886.

Status of Service-at-Cost at Rochester

With the New York State Railways thrown into a receivership, status of the service-at-cost contract between the railways and the city of Rochester is doubtful. The contract would expire on Aug. 1, but under its provisions, in the event of a receivership, it becomes void unless the City Council passes special legislation to retain it. If the contract is declared void, a 5-cent fare automatically goes into effect under a strict interpretation of the terms of the document. Realizing that such a course would be ruinous to the company it is believed that the Council will authorize retention of the present contract until Aug. 1. It is expected that negotiations will be started at once toward drafting a new contract. A deadlock on all municipal legislation in 1930 is threatened, with four regular and four insurgent Republicans, and the Mayor too ill to take part.

No Hope for Seattle to Do Better on Purchase

Councilman Blaine, head of the finance committee of the City Council of Seattle, Wash., who is on a visit to eastern cities, says that, in his opinion, Seattle has virtually no chance at this time of refinancing its municipal railway purchase debt with new bonds longer in life than those issued originally. He declares the two-year moratorium arranged by Mayor Edwards with A. W. Leonard, president of the Puget Sound Power & Light Company, offers the city the only way out of the critical financial situation affecting the railway. During his absence, Mr. Blaine's colleagues have passed an ordinance providing for acceptance of the two years extension of time on the 1930 and 1931 installments offered by Mr. Leonard. They are now considering passage of an alternative bill which would provide for actual retirement of the 1930 installment of $833,000 with new twenty-year bonds.

Digitized by Google

Renewal of Toledo Ordinance an Issue

City officials of Toledo, Ohio, are studying the Milner ordinance, under which the Community Traction Company operates, in an effort to prevent any increase in the fare due to the provisions of the ordinance. After the expiration of the first ten years of its operation, the ordinance must be extended or an amortization fund be set up to retire the bonds and preferred stock of the Community Traction Company. Street Railway Commissioner E. L. Graumlich estimated that a fare increase of 1½ cents over the present rates would be necessary to set up the required amortization fund. In the event that the Milner ordinance is extended, this amortization fund will not be necessary immediately. Martin S. Dodd, city law director, said the question of the necessity of submitting this ordinance to the people for renewal is debatable.

Suggestions from Railway President on St. Louis Problems

Stanley Clarke, president of the St. Louis Public Service Company, at a meeting of the Transportation Survey Commission, on Jan. 23 took issue with some of the recommendations made in the reports of R. F. Kelker, Jr., consulting engineer of the commission, relative to traffic improvements. At the suggestion of Mayor Miller, Mr. Clarke will submit a written report in which he will give his own suggestions for improving traffic conditions in the city.

Mr. Clarke expressed the belief that Mr. Kelker was considering the question in terms of vehicles rather than of people. Wider streets and super-highways would serve to bring more vehicles into the congested districts, while the big problem was how to get more people into the business section. This could best be done by making it possible for street cars to move more freely. He said that street cars do not require wide streets if other vehicles are kept out of the way.

Mr. Kelker concluded that subways downtown would not be of much benefit to street car riders, but Mr. Clarke held them of "immeasurable benefit."

In discussing traffic conditions in the business district Mr. Clarke pointed out that 40 per cent of cars on the Olive Street lines frequently are rerouted at Twelfth Boulevard due to congestion east of that thoroughfare.

South Shore Plans New Freight Terminal for South Bend

Another step has been taken by the Chicago, South Shore & South Bend Railroad in its plan to eliminate freight traffic over the city streets in the recent acquisition of an 11½-acre tract in South Bend for the construction of a new freight terminal. The acquisition and development of this property, according to plans of the line, will enable the company to offer shippers prompter and more convenient service, will eliminate the movement of freight over South Bend streets and will open up highly desirable sites for industries.

The company will develop the site as a freight terminal and industrial site with inbound and outbound freight tracks and houses. All present buildings are to be reconditioned and made suitable for the use of industrial tenants. The property is to be provided with adequate and suitable team tracks, and two large warehouses are to be reconditioned for use as inbound and outbound freight houses.

When the new terminal is completed, the South Shore Line will abandon its present freight terminal on LaSalle Street, and will discontinue the present method of handling less-than-carload freight in tractor-trailers over South Bond Street from the old freight house at Orange and Olive Streets to the LaSalle terminal.

Growth in freight business also has necessitated enlarging the South Shore Line's freight yard at Burnham, Ill. At the present time the yard has a capacity of 110 cars on two tracks. When the added trackage is installed, the yard capacity will be 550 cars. The project includes installation of two new main line tracks on the north side, the use of the present main line tracks for freight service and the addition of a fifth freight track. The yard is used for the classification of empty cars, to facilitate delivery and movement. Work on this project is now 60 per cent completed.

Abandonments in Indiana

Arthur W. Brady, receiver for the Union Traction Company of Indiana, has announced that service on the Muncie-Union City division will be discontinued on Feb. 8, and on the Anderson - Middletown division, Feb. 28. Authority for abandonment of the two lines was granted on Jan. 23 by Judge Morrow in the Madison County Circuit Court. The Public Service Commission approved the abandonment several months ago. The Muncie-Union City line is 32.6 miles long and the Anderson-Middletown division, 9.6 miles. Mr. Brady said:

"The Muncie-Union City interurban line has been a factor of importance in the social and business life of the communities it serves for a quarter of a century, and it is with regret and reluctance that the decision to terminate has been reached. That determination has been forced by conditions beyond the control of the company. In addition to the losses caused all railway lines by the constantly increasing use of automobiles, this division has suffered acutely from the abandonment of the old Union City-Dayton line, with which for many years it interchanged a considerable volume of business. The large deficits due to these causes it has proved impossible to overcome through fare revisions, improved service or other means."

Mr. Brady expressed appreciation for the efforts recently made by business men in communities along the line to canvass their towns for enough freight traffic to put the line on a profitable basis and thus forestall abandonment of the service.

One-Man Car Case Won by Shreveport Railways

As noted in ELECTRIC RAILWAY JOURNAL NEWS for Jan. 18, it has been indicated in a report of the District Court of the United States for the Western District of Louisiana, dated Jan. 6, in the suit in equity of the Shreveport Railways vs. City of Shreveport to enjoin the enforcement of an ordinance requiring two men on each street car, that the decree will insure the use of one-man cars: "the type of car which will give the greatest safety and efficiency." The case is important not only in its bearing on the one-man ordinance, but also because the power of the police to enforce a requirement of this kind was questioned. The report was signed by District Judge Ben C. Dawkins. It states in part:

No public service commission in any state now refuses to permit the use of one-man safety cars. Conditions are altogether different from what they were in 1917, when the Supreme Court rendered a decision in the Sullivan case favorable to two-man operation. Then the one-man car was in its experimental stage; now the safety car appears as safe as those operated with two men.

A municipality's right under its police power to interfere in matters of this kind exists only when necessary to the safety and convenience of the public. The philosophy of our institutions warrants reasonable regulations only, and there must be some real justification for the exercise of the power.

Street cars appear to be an essential means of transportation for a large portion of the population of cities and the loss of such service would be a serious handicap to a growing city. On the whole, I believe the refusal to allow the use of one-man cars of the latest type, at least until they can be properly tested, in the light of the proved experience of other cities, is arbitrary and amounts to a taking of the railway's property without due process of law, results in confiscation, and the enforcement of the ordinances complained of will be enjoined.

The comments of Judge Dawkins were preceded by a lengthy report of a master. Among his findings, included in the report, are:

That the city ordinances existed and would be enforced as alleged, unless the court intervenes; that the net return upon the present value of the railway was approximately 0.0243 per cent; that the property was economically managed; that operating expense, exclusive of depreciation and taxes, was 0.2323 cent per car-mile, as compared to 0.271 cent for 24 similar companies; that no dividends have been paid since 1923; that one-man operation will effect a saving of $93,922 a year in wages, and that it would not be necessary to discharge any employees in making the change.

That, from the evidentiary facts, the one-man car, a modern safety car equipped with all the automatic safety devices, has been shown by a clear preponderance of the testimony to be safer than its predecessor, the two-man car.

That the speed and schedules of street car systems have been increased under one-man operation, that companies are able to operate more cars, that wages have been increased, and that operators become more efficient and better satisfied.

That since 1917 no public service commission has refused to permit the operation of one-man cars, and since 1924, no commission has limited the right to use one-man cars subject to any particular conditions.

The court reserved to the defendants the right to apply for a modification of the decree should the conditions warrant.

The case for the company was most ably presented by W H. Armbrecht of Armbrecht, Hand & Twitty, Mobile, Ala., and A. B. Freyer of Wis., Randolph, Rendell & Freyer, Shreveport, La.

Digitized by Google

Southern Equipment Men Analyze Maintenance Practices

NO TYPE of equipment escaped analysis at the meeting of the Electric Railway Association of Equipment Men, Southern Properties, held at Birmingham, Ala., on Jan. 27, 28 and 29. All were covered in the papers presented, either from the standpoint of their maintenance or their application. Papers on maintenance subjects covered armature room tests, car lubrication and inspection. Other papers covered a variety of subjects, including the new Pittsburgh car.

Practically all of the second day was devoted to the discussion of the association's questionnaire. A total of 53 live questions were entered and each provoked many valuable ideas.

Every detail of Pittsburgh's new aluminum car was given by D. H. Bell, engineer of equipment Pittsburgh Railways, in the first paper presented. In introducing his subject Mr. Bell said:

"There undoubtedly exists in the electric railway industry today the economic need for a new vehicle to supersede the present street car. The need is paramount on account of the increasing competition of the private automobile and the motor coach. Whether this new vehicle will operate on the rails or rubber tires is at present impossible to determine because of the many variable factors. There are, however, certain fundamental characteristics which any new vehicle should embody if it hopes to find its place and be adopted by the electric railways."

An article describing the Pittsburgh car appeared in the JOURNAL for July, 1929.

Q. W. Hershey, supervisor of maintenance sales Westinghouse Electric & Manufacturing Company, in his talk on co-operation between operator and manufacturer, declared that "Probably no other businesses in the world are so intimately interdependent as are the electrical equipment manufacturer and the operator utilizing this equipment in public service."

According to Perkins Prewitt managing director Birmingham Safety Council "everything material wears out, and the only way to prevent accidents from equipment failures is to set a high standard of maintenance and accompany this character of work with frequent inspections."

Some of the tests more commonly used in the armature room and the merits of each were outlined by R. S. Beers, General Electric Company.

"Car Lubrication" was the subject of a paper prepared by A. T. Clark, superintendent of rolling stock and shops United Railways & Electric Company, Baltimore. Summarizing the results of more than three years of use of a new lubrication, Mr. Clark stated:

"Power consumption has been reduced and during the winter months shows only a slight increase over the summer months, improved lubrication as borne out by tests has resulted, cars drift and coast as never before due to better lubrication and greater air-brake piston travel, and the total cost of oils, wool waste and bearings on the car-mile basis is lower today than it was in 1926, notwithstanding the use today of higher cost oil and all wool waste."

"The urban transportation industry is confronted with a form of competition which came into being gradually and insidiously but which today is tremendously effective. I refer to the private automobile." With this introduction the paper on motor bus transportation, prepared by C. S. Sale, president of the American Car & Foundry Motors Company, and presented by L. H. Hyneman, launched into an analysis of recent bus developments. Mr. Sale referred to the difficulties surrounding rail operation in cities of from 50,000 to 75,000 inhabitants, and added that buses in many cases would reduce operating expenses and build up riding. The speaker also discussed the use of trackless trolleys for certain lines.

That close inspection, other than reducing maintenance cost, is nothing more or less than a necessary part of meeting the ever present public demand for better service was the key thought expressed by J. J. Vaughan, master mechanic Memphis Street Railway, in a paper on inspection.

"A New Era in Street Car Mechanics and Operation" was the subject of a paper by N. R. Brownyer, railway engineer Timken-Detroit Axle Company, presented by H. J. Lidkea. "There has been much conversation on the subject of modernization in rolling stock," Mr. Brownyer stated, "but too often this led only to a revision in paint schemes, floor coverings or seat styles, while improvements in the mechanics were invariably neglected." Mr. Brownyer outlined in detail the development of the new Timken-Detroit worm-drive truck and the features of the truck designed to reduce noise, lower maintenance cost, increase efficiency, reduce the unsprung weight, increase braking rates and improve the performance.

In discussing the possibilities of the electric coach, Walter S. Rainville, equipment engineer, New Orleans Public Service, Inc., said:

"We feel that its future is assured because it is speedy, safe, comfortable, dependable, economical and modern in every respect. It is improbable that the electric coach will displace the street car for handling mass transportation on heavy lines, but there are lines on which travel is light, where the coach can be substituted profitably. It should also find application in extensions to existing lines where additional track would involve heavy first costs.

Officers were re-elected at the opening of the third day. They are: A. Taurman, president; W. H. McAloney, vice-president, and L. O. Eiffert, secretary-treasurer.

Conspectus of Indexes for January, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares* 1913 = 4.84	Jan., 1930 **7.85**	Dec., 1929 **7.78**	Jan., 1929 **7.71**	Jan., 1930 **7.85**	Jan., 1925 **7.24**
Electric Railway Materials* 1913 = 100	Jan., 1930 **144.4**	Dec., 1929 **144.9**	Jan., 1929 **145.3**	Dec., 1926 **159.2**	Feb., 1928 **139.5**
Electric Railway Wages* 1913 = 100	Jan., 1930 **231.3**	Dec., 1929 **231.1**	Jan., 1929 **229.9**	Jan., 1930 **231.3**	Jan., 1925 **221.0**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	Jan., 1930 **204.5**	Dec., 1929 **205.1**	Jan., 1929 **204.5**	Nov., 1928 **205.7**	July, 1929 **199.0**
General Construction Cost Eng'g News-Record 1913 = 100	Jan., 1930 **209.0**	Dec., 1929 **209.5**	Jan., 1929 **209.4**	Jan., 1927 **211.5**	Nov., 1927 **202.0**
Wholesale Commodities U. S. Bur. Labor Stat. 1926 = 100	Dec., 1929 **94.2**	Nov., 1929 **94.4**	Dec., 1928 **96.7**	Nov., 1925 **104.5**	Apr., 1927 **93.7**
Wholesale Commodities Bradstreet 1913 = 9.21	Jan., 1930 **11.68**	Dec., 1929 **12.24**	Jan., 1929 **12.96**	Dec., 1925 **14.41**	Jan., 1930 **11.68**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	Dec., 1929 **158.0**	Nov., 1929 **159.7**	Dec., 1928 **155.8**	Nov., 1925 **167.1**	Apr., 1925 **150.8**
Cost of Living Nat. Ind. Conf. Board 1914 = 100	Dec,. 1929 **162.0**	Nov., 1929 **163.3**	Dec., 1928 **162.1**	Nov., 1925 **171.8**	Apr., 1929 **159.3**
Industrial Activity Elec. World, kw.-hr. 1923-25 = 100	Dec., 1929 **116.4**	Nov., 1929 **122.9**	Dec., 1928 **127.3**	Feb., 1929 **140.4**	Aug., 1925 **94.3**
Bank Clearings Outside N. Y. City 1926 = 100	Dec., 1929 **98.6**	Nov., 1929 **111.2**	Dec., 1928 **106.6**	Oct., 1929 **111.8**	Nov., 1926 **94.0**
Business Failures Number	Dec., 1929 1827	Nov., 1929 1536	Dec., 1928 1673	July, 1929 1581	Sept., 1928 1348
Liabilities, Millions of Dollars	**68.33**	**53.86**	**47.04**	**102.09**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Digitized by Google

PERSONAL MENTION

L. G. Tighe, Assistant General Manager at Akron, Heads C. E. R. A.

Lawrence G. Tighe was elected president of the Central Electric Railway Association at a meeting held in Cleveland on Jan. 24. He is a director and assistant general manager of the Northern Ohio Power & Light Company, Akron, Ohio, with which he has been connected since 1916. He went from the Consumers Power Company in Michigan to Akron as general superintendent of production and distribution of the light and power division of the company. At that time the system in Akron was in a run-down condition. The equipment was not in good shape

L. G. Tighe

and the service was decidedly unsatisfactory. Mr. Tighe made a careful survey of the situation, and worked out methods whereby the system was gradually brought up to its present state of efficiency. In recognition of that work, he was made assistant general manager of the company in January, 1925.

Mr. Tighe was elected to the board of directors of the company at Akron in 1929 to take the place of Charles Currie, who died a short time before. Since his elevation to the position of assistant general manager, he has taken over the major part of the details connected with the operation of both the light and power division and the transportation division of the company.

The new president of the Central Electric Railway Association was born in Saratoga Springs, N. Y., on Oct. 10, 1886. He attended school in Schenectady but during the summer months he lived on his grandfather's farm near Saratoga. There he harbored the notion that he would like to become a real farmer. A few years in school aroused his interest in electricity with a consequent subjugation of the impulse to farm it. When he finished school, he secured employment in the works of the General Electric Company at Schenectady. He stuck to the business and studied nights. In a few years the company sent him to its branch in Detroit where he remained several years and was then promoted to a position in the Jackson, Mich., plant. He remained with the General Electric Company until 1913 when he became connected with the Consumers Power Company in Jackson, controlled by Hodenpyl, Hardy & Company.

Mr. Tighe is nothing if not persistent. He has never put the farm idea completely out of his mind. So far, however, the nearest he has come to his original desire to become a farmer is to become the owner of some three acres of land just outside the city limits of Akron. There he has his home. He is very much interested in making this country place attractive and is a grower of flowers and shrubs. His chief recreational diversion is golf. He is a member of the Elks, Fairlawn Golf, City and Kiwanis clubs. He is fond of music and has a reasonably good voice. He is known as a "bear for work" and is happiest when he is engrossed in analysing a knotty problem.

✦

F. H. Dohany on Detroit Commission

Additional changes are announced in the personnel of the Detroit Street Railway Commission, charged with the responsibility of operating Detroit's municipal street railway and bus lines. John J. Gorman has resigned from the commission and Frank H. Dohany has been appointed by Mayor Bowles to succeed him. Two months ago G. Ogden Ellis resigned as president of the commission. Commissioner John J. Barlum succeeded him in that post. It is expected that Frank Couzens, successor on the board to Mr. Ellis, will be made vice-president of that body.

Mr. Gorman was appointed during the administration of John W. Smith. In a formal letter to the Mayor, Mr. Gorman said that he wished to give up his commissionship last fall, but at the time Mr. Barlum, now president of the body, urged him to remain until the new Mayor took office. When he accepted the appointment 2½ years ago Mr. Gorman had just retired from active business and, having no immediate plans, welcomed the opportunity of rendering a public service. However, in the past year his mortgage banking business has grown to such proportions that it now requires all his time and attention. It will be recalled that last fall he presented a definite plan for the creation of a crosstown elevated highway over the right-of-way of the railroads.

In addition to conducting an active law practice, Mr. Dohany, the new member of the commission, is a director of the American State Bank, a director and vice-president of the American Fort Street Company and president of the Southington Woods Company. He was born in Southfield, Oakland County, 55 years ago. He acquired his education at the state normal school at Ypsilanti and the Detroit College of Law. He was admitted to the bar in 1895.

G. W. Jones in Important Post in Brooklyn

George W. Jones, who has been vice-president of the Brooklyn & Queens Transit Corporation since July 1, 1929, and who, prior to that time, was vice-president and treasurer of the Brooklyn City Railroad, was appointed vice-president also of the Brooklyn-Manhattan Transit Corporation, the New York Rapid Transit Corporation and the Williamsburgh Power Plant Corporation, on Jan. 1, 1930. As indicated briefly in the ELECTRIC RAILWAY JOURNAL previously Mr. Jones will have charge of all contracts for materials and supplies for the four companies and will have direct charge of the purchasing department.

Mr. Jones is a veteran of the Spanish-American War and after the war was connected with the Department of the Interior of the Insular Government of Porto Rico for nine years. This department had charge of all public utilities, public lands, public buildings, public roads and the telegraph system.

G. W. Jones

During his last two years on the island, Mr. Jones was assistant commissioner of the interior for Porto Rico.

After returning to the United States, Mr. Jones was a member of the staff of the J. G. White Company for several years. Subsequently he joined the engineering firm of Sanderson & Porter. When the Brooklyn City Railroad resumed independent operation on Oct. 19, 1919, Mr. Jones was elected treasurer and five years later was also made vice-president. On July 1, 1929, he became vice-president of the Brooklyn & Queens Transit Corporation at the consolidation of the various B.-M.T. surface operating companies and the Brooklyn City Railroad into the Brooklyn & Queens Transit Corporation.

✦

Added Responsibility for H. W. Godfrey With P.R.T.

H. W. Godfrey, superintendent of instruction of the Surface Lines of the Philadelphia Rapid Transit Company, Philadelphia, Pa., has been appointed acting superintendent of instruction of the surface lines, buses and cabs, reporting to R. F. Tyson, vice-president.

F. G. Suria has been appointed assistant superintendent of instruction. The following chief instructors will be continued: J. W. Hall, chief instructor for the surface lines. F. Humphreys, chief instructor for the buses, S. Edwards, chief instructor for the cabs.

Digitized by Google

Miss Caroline Hein Secretary in Cincinnati

Miss Caroline Hein has been elected secretary of the Cincinnati Street Railway, Cincinnati, Ohio, to succeed Joseph Nicholson, who died on Nov. 19, 1929. Miss Hein started her railway career in December, 1917, as secretary to Walter A. Draper when he was vice-president of the Cincinnati Traction Company. A few years later she was made assistant secretary of that company and of the Ohio Traction Company.

When the Cincinnati Street Railway took over the operation of the street cars in Cincinnati in November, 1925, Miss Hein was retained as assistant secretary of the reorganized operating company. She served in that position up to her present promotion. She also acted as librarian for the railway and has established one of the best industrial libraries in Cincinnati.

✦

F. P. Royce Retires from Stone & Webster

Frederick P. Royce is retiring as a vice-president of Stone & Webster, Inc., Boston. For the past two years Mr. Royce has devoted his time and attention to executive matters, financial problems and special studies for Stone & Webster, Inc. During 1919, in connection with Stone & Webster activities in the railway situation in New York, he acted as general manager for the receiver of the Brooklyn Rapid Transit Company, since succeeded by the Brooklyn-Manhattan Transit Corporation, and assisted in examining the situation on the Interborough Rapid Transit Company and advising about it. On Jan. 1, 1920, he became a partner in Stone & Webster in general charge of the securities division and for a year or more continued in advisory work in connection with the railway situation in New York. When Stone & Webster was incorporated, July 1, 1920, Mr. Royce became vice-president and continued in charge of the securities division until the firm of Stone & Webster & Blodgett was incorporated in January, 1927.

Mr. Royce became associated with Stone & Webster in 1909, acting first as division manager in the Management Association in charge of some of the New England companies, and shortly afterwards as vice-president of the management division, continuing with the New England companies, also the Minneapolis company, the two Houghton companies, and Paducah. He was also actively engaged in the development of new business.

Howard L. Rogers and Frederick S. Pratt also are retiring as vice-presidents of Stone & Webster, Inc.

✦

C. M. Shelter Heads Stark Electric

Curtis M. Shetler, Canton, Ohio, general counsel for the Suburban Light & Power Company and the Utilities Service Corporation, has been elected president of the Stark Electric Railroad. Mr. Shetler succeeds W. E. Davis, who has retired from the directorate of the company. Other officers are Everett W. Sweezy, vice-president; C. E. Sperow, vice-president and general manager; O. K. Ayers, treasurer and assistant general manager and W. H. Grimes, secretary and auditor. At the same time the appointment of Mr. Ayers as district manager for the Alliance division of the Suburban Light & Power Company was made public. He succeeds C. A. Thomas, chief engineer, who will devote his entire time to engineering work.

The Stark Electric Railroad, a branch of the Utilities Service Corporation, operates between Canton and Salem, a distance of 35 miles. Headquarters are in Alliance.

✦

J. C. Newman Way Engineer at Richmond

J. C. Newman was transferred from Norfolk to Richmond on Jan. 1, as engineer of maintenance of way for the Virginia Electric & Power Company. Mr. Newman has been in charge of track maintenance on the Norfolk properties for several years.

J. C. Newman

Before coming to Virginia, he was engaged for three years by the Public Service Commission of New York, being in charge of track alignment and grades on the construction of rapid transit lines in New York City.

He is a native Kentuckian and was graduated from the University of Kentucky. After finishing school, he was with an oil company in Illinois for a short while and later was engaged on special work design for the Lorain Steel Company at Johnstown, Pa.

✦

W. A. Robertson Appointed to Fort Worth

W. A. Robertson, general superintendent of the Jacksonville Traction Company, Jacksonville, Fla., has been made general superintendent of the Northern Texas Traction Company at Fort Worth, Tex. Mr. Robertson went to Jacksonville 5 years ago from Beaumont, Tex., where he was superintendent of railways for the Eastern Texas Electric Company. Prior to his work in Beaumont, he was superintendent of transportation for the Galveston-Houston Electric Company, operating an interurban between Galveston and Houston. Eight years before becoming connected with the interurban, he was employed by the Houston Electric Company, in various capacities. He has been connected with companies operated by Stone & Webster, Inc., for nearly twenty years.

Messrs. Burch and McWethy Consulting Engineers

Edward P. Burch, for many years a consulting engineer of Minneapolis, and Harold E. McWethy, for the past three years valuation engineer of the Twin City Rapid Transit Company of Minneapolis, have become associated as consultants and analysts with offices in the Foshay Tower in Minneapolis.

Mr. Burch has been engaged for more than 30 years as consultant for many railways, railroads, and power companies, on operation, valuation and consolidation questions, and in rate cases, at Minneapolis, Seattle and Everett, Detroit, and Cleveland. He is a director of the Minneapolis, Northfield & Southern Railway, and the receiver of the Minneapolis, Anoka & Cuyuna Range Railway. His book, "Electric Traction for Railway Trains," has been used as a text and reference work in many universities.

Mr. McWethy has had a broad experience in public utility valuation and statistical research. Following his graduation from the University of Wisconsin Engineering College in 1909, he spent two years as an apprentice with the Westinghouse Electric & Manufacturing Company. The next nine years he served as valuation engineer and case investigator for the Railroad Commission of Wisconsin. Then followed two years of public utility valuation work in Nashville, Philadelphia, and in the state of Mississippi, and four years as street railway engineer of the Minnesota Railroad and Warehouse Commission before he became valuation engineer for the Twin City properties.

✦

Henry Bucher in Charge of Midland Properties

Announcement has been made by Robert M. Feustel, executive head of the Midland United Company, that the operation of the railway properties in Indiana controlled by that company would be co-ordinated under Henry Bucher, Fort Wayne, as general railway executive. The company operates power, light, railway and gas utilities in northern Indiana, particularly in the eastern section of the state.

Mr. Bucher has been railway manager of the Indiana Service Corporation for the last six years. He also had been manager of the Fort Wayne division of the Indiana Service Corporation. Mr. Bucher's office will be in Indianapolis. The position of division manager will be filled by H. E. Vordermark, who has been treasurer of the Indiana Service Corporation for many years and who for the last few years also has been vice-president.

If the petition of the Insull-controlled Central Indiana Power Company for a merger with the Terre Haute, Indianapolis & Eastern Traction Company and the Terre Haute Traction & Light Company should be approved by the Indiana Public Service Commission, the direction of all the railways would be under the divisional management of Mr. Bucher.

The Midland Company, an Insull holding company operating extensive properties in Indiana, also has made bids with bondholders for the purchase of control of the Union Traction Company of Indiana, now in receivership.

Digitized by Google

E. K. Miles in Charge in Syracuse

Earl K. Miles has mounted the business ladder from motorman to general manager of the Syracuse lines of the New York State Railways, to which post he was named on Dec. 23, at the same time that B. E. Tilton, vice-president and general manager of the system, was elected president of the company. Mr. Miles attended school at Adams and later at Albany Business College. His first real job was as a motorman in Syracuse. In 1916 he left the railway to become a mail clerk. On Jan. 1, 1919, he returned to the railway. The second step upward came in June, 1922, when he was appointed division superintendent of the Tallman division. Three years later he was made assistant to the general superintendent and shortly thereafter was made superintendent of transportation.

✦

Jim Malone Assistant to A. D. McWhorter in Memphis

Jim Malone—no one in Memphis would think of calling him anything else—has been appointed assistant to A. D. McWhorter in directing transportation of the Memphis Street Railway, Memphis, Tenn. This step is a distinct promotion for Jim, and comes in acknowledgment of his capable work during the period that he has been associated with the office of Mr. McWhorter.

Mr. McWhorter says that Jim knows every angle of street railway transportation by experience. He also emphasized Jim's dependability at doing every job, large or small, committed to him. As general superintendent Mr. McWhorter has charge of two other departments besides transportation. Jim's duties, however, are as assistant to the transportation department.

Jim became connected with the company on Feb. 13, 1921, as traffic checker in the schedule department and has worked there in different capacities since that time. After completing a course in the Memphis Law School at night, he passed his bar examinations in June, 1929.

This fall when instructors for the men were being chosen to conduct educational classes, Jim was selected as one of them and in this work he has demonstrated his faithfulness and ability.

✦

B. F. Braheney Elected Vice-President

Bernard F. Braheney, elected vice-president in charge of accounting of the Bylesby Engineering Management Corporation, Chicago, Ill., has been with the Bylesby organization since 1910. He started as a clerk in the auditing department of the Northern States Power Company at Stillwater, Minn. During the latter part of 1910 and 1911 he served as bookkeeper of the South St. Paul office and the White Bear, Minn., office of the Northern States Power Company. In 1912 he was paymaster of the Appalachian Power Company at Bluefield, W. Va., and later in the year was bookkeeper of the Louisville Gas & Electric Company.

In 1913 Mr. Braheney was made accountant of the Minneapolis General Electric Company in the Northern States Power Company system, and in 1915 he became traveling auditor of the company. In 1915 he was appointed assistant general auditor of the Northern States Power Company, which position he held until 1920 when he was made assistant general auditor of the Byllesby Engineering & Management Corporation with headquarters in Chicago. Since 1923 he has been general auditor of the company.

✦

F. K. Baker in Important State Post in West

Fred K. Baker, Everett, Wash., is the newly appointed head of the Department of Public Works for the state of Washington. This body regulates bus transportation as well as motor freight in that state, grants all certificates, passes on transfers and extensions, and makes rulings which have an important bearing on the industry. Mr. Baker has served since last August as supervisor of transportation, but late in December gave up that post, and upon the resignation of Judge Denney, who was then director, Mr. Baker was appointed to that post.

✦

Charles F. Scott Awarded the Edison Medal

The Edison Medal of the American Institute of Electrical Engineers has been awarded to Prof. Charles F. Scott, New Haven, Conn., "for his contributions to the science and art of polyphase transmission of electrical energy."

The Edison Medal was founded by associates and friends of Thomas A. Edison, and is awarded annually for "meritorious achievement in electrical science, electrical engineering, or the electrical arts," by a committee consisting of 24 members of the American Institute of Electrical Engineers.

Charles F. Scott is professor of electrical engineering at Yale University. He was born at Athens, Ohio, on Sept. 19, 1864. He was educated at Ohio University in Athens, the Ohio State University, Columbus, from which he graduated in 1885, and Johns Hopkins University, where he engaged in graduate study for more than a year.

✦

H. O. Crews in New Post

Halbert O. Crews, for seven years director of public relations for the Chicago Surface Lines, was recently appointed public administrator for Cook County by Governor Emmerson. He was sworn in on Jan. 24 and at once assumed charge of the office. Before his association with the Chicago Surface Lines, Mr. Crews was managing editor of a paper in Springfield, Ill. He was also at one time superintendent of departmental reports under Governor Lowden of Illinois.

✦

W. W. Weddle Terre Haute Roadmaster

W. W. Weddle, formerly assistant roadmaster of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., was promoted on Jan. 7 to the position of roadmaster. He succeeded John O'Laughlin, deceased. Mr. Weddle started work with the Terre Haute, Indianapolis & Eastern Traction Company as a section laborer in 1907. He was made foreman in 1912, supervisor in 1921 and assistant roadmaster in 1924.

✦

L. H. Seagrave Chairman of United States Electric Power

Louis H. Seagrave, chairman of the board of the United States Electric Power Corporation, has been elected chairman of the board of the Standard Power & Light Corporation, which will control the Standard Gas & Electric Company. Victor Emanuel, president of United States Electric Power, has been elected president of Standard Power & Light. John J. O'Brien continues as president of Standard Gas & Electric. No changes will be made in the officers of the latter company, whose stockholders also have approved the reorganization plan announced at the end of last year.

✦

J. I. Foster in New Memphis Post

J. I. Foster, for several years superintendent of transportation with the Memphis Street Railway, Memphis, Tenn., has been appointed to direct the work of the welfare department, just established to provide a means by which the company may manifest its interest in the welfare of all employees.

Mr. Foster knows more employees probably than any other official of the organization. He has given much of his time in the past to visiting the homes where sickness or distress have come.

The company management considers the work so important and his own fitness for it so apt, that his transfer to it is to be regarded in the light of a promotion.

Mr. Foster began his railway career in Chattanooga in 1883. In 1900 when the Memphis company desired to secure an active, dependable man to assist the general superintendent, Mr. Foster was recommended, and he came to Memphis at that time as the assistant to Frank Smith.

✦

R. B. Stearns Massachusetts Northeastern Receiver

Federal Judge Brewster has appointed Robert B. Stearns of Boston receiver for the Massachusetts Northeastern Street Railway, Haverhill, Mass., operating more than 100 miles of electric railway. He was bonded for $35,000. Mr. Stearns was formerly vice-president, general manager and treasurer of the Eastern Massachusetts Street Railway, from which he withdrew as an officer in January, 1929, after more than ten years of service with the company.

✦

E. A. Mitchell, formerly in charge of taxicab inspection in the Public Utilities Department, has been appointed senior street railway inspector, and assistant to George B. Avery, superintendent of public utilities, Seattle, Wash.

✦

W. L. O'Brien has been appointed superintendent of transportation and traffic of the Rochester, Lockport & Buffalo Railway, Rochester, N. Y., succeeding A. Blaine Miles, resigned. R. W. Travisee has been appointed assistant superintendent of transportation and traffic, succeeding W. L. O'Brien, promoted.

Digitized by Google

OBITUARY

A. T. Spencer

Albert T. Spencer, general superintendent of construction and maintenance, Montreal Tramways, died at his home on Jan. 26. He had been ill about two months.

Probably the best-known way engineer in Canada, Mr. Spencer had made a reputation for himself that was international. He had held his position in Montreal since December, 1926, having come to it from the post of assistant to the general manager of the Toronto Transportation Commission. In May, 1921, he had accepted the important position of engineer of way of the Toronto Transportation Commission in anticipation of the extensive program of track rehabilitation which began when the commission took over the street railway lines of Toronto the following September. Under his direction about

A. T. Spencer

200 miles of track was rebuilt according to the most modern standards, and considerable new track was laid. The work was done in a surprisingly short time, largely because Mr. Spencer made use of the latest types of construction machinery and resorted to many novel methods.

Following the completion of the rehabilitation program, Mr. Spencer was made assistant to the general manager of the Toronto Transportation Commission in May, 1924, continuing in that position until his return to Montreal at the end of 1926.

Mr. Spencer's engineering career began in 1900 with the Dominion Coal Company at Glace Bay, N. S., where he was engaged in general construction, mining and railway work. He was field engineer with the Canadian Pacific Railway from 1903 to 1905, and until 1906 was chief of party. In 1906 he entered the employ of the Montreal Street Railway as engineer of survey, location and construction of certain projected suburban electric lines. Following the completion of this assignment he began regular work on the staff of the company and its successor, the Montreal Tramways, serving as assistant engineer in charge of maintenance of way. He left Montreal in January, 1921, to go with the Hydro-Electric Power Commission of Ontario as assistant engineer in the railway department. There he remained until his connection with the Toronto Transportation Commission later in the same year.

For many years Mr. Spencer was active in the American Electric Railway Engineering Association. At the time of his death he was a member of the standing committee on way and structures and of the committee on nominations. He did much research on the use of special steels in trackwork and on methods of hardening rail. He was an associate member of the Engineering Institute of Canada, a member of the Association of Professional Engineers of Quebec, a member of the Association of Professional Engineers of Ontario and a member of the American Society for Municipal Improvements.

✦

Maurice A. Welsh

Maurice A. Welsh, superintendent and traffic manager of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, died at the Chicago Memorial Hospital, Chicago, Ill., on Jan. 18.

Mr. Welsh's railroad service combined hard work and outstanding ability in a very unusual degree. To his originality he coupled force and energy, being persistent to translate his ideas into action. His ability to make and retain the friendship of all who knew him was evidence of his sincerity, good faith and unfailing geniality. He was unswervingly loyal to his railroad and to his superiors. He was fair to the public and never too busy to give intelligent and sympathetic consideration to every complaint. Above all, he tempered justice to his associates with real friendliness, so that he held the respect of all who worked under him.

Mr. Welsh was born at Iron River, Mich., on March 4, 1887. He entered the service of the Illinois Central Railroad in 1903 as special agent, in which capacity he was employed until early in 1910, when he resigned to enter the Police Department of the city of Waterloo. In 1911 he accepted the position of special agent with the Waterloo, Cedar Falls & Northern Railway. On March 1, 1917, he was promoted to be superintendent with jurisdiction over the operating and claims departments, and on Dec. 20, 1922, his jurisdiction was extended to the traffic department with the title of superintendent and traffic manager.

✦

H. C. Higgins

Henry C. Higgins, who helped to build many electric railways in Iowa, Wisconsin and Illinois in his six decades of activity as a public utilities engineer, died on Jan. 22 in Centralia, Ill., where he had resided for the past 23 years. Mr. Higgins began his career as a contractor on the Baltimore & Ohio Railroad's western lines at the age of 21 years, but afterward confined himself to the utility field. His last important executive positions were as manager of the Sterling, Dixon & Eastern Electric Railway and manager of the Lee County Lighting Company at Dixon, Ill. He was part owner and an executive of these companies from the time of their inception until July, 1907, when he retired from active business.

Julius Theobald

Julius Theobald, general manager of the Springfield Railway, Springfield, Ohio, died at his home in that city on Jan. 15, following an illness of three months. Mr. Theobald was born in Columbus 54 years ago. He attended high school there and later went to Ohio State University from which he was graduated. He entered the utility field after finishing his college work, and his ability as a leader and executive was soon recognized. After a series of promotions he accepted a position as superintendent of the Atlantic City Electric Light Company. Two years ago he went to Springfield to become general manager of the Springfield Railway.

✦

James A. Duffy

James A. Duffy, superintendent of equipment for the Monongahela-West Penn Public Service Company, Fairmont, W. Va., for ten years, died on Jan. 1. Mr. Duffy was born at West Newton, Pa., 57 years ago. In his early manhood he moved with his family to Pittsburgh and there he was located for many years. He was employed with the Duquesne Traction Company and the Fifth Avenue Traction Company in Pittsburgh, later with the Pittsburgh Railways. From Pittsburgh Mr. Duffy went to Havana, Cuba, with the Greenwood Engineering Company, and was for some time engaged there in construction work as chief engineer, and he was also with the Havana Electric Railway in Cuba. On his return to Pittsburgh from Cuba, Mr. Duffy became master mechanic with the Pittsburgh Railways. He was also master mechanic of the Penn-Ohio System for seven years.

✦

John O'Laughlin

John O'Laughlin, roadmaster for the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., died on Jan. 2. Mr. O'Laughlin was 75 years old. He started in railroad work as a water boy. He helped to build the present lines of the Erie Railroad in New York State and was with the Erie for many years. Following this he served on the Ann Arbor Railroad for some time, but in 1912 joined the Terre Haute, Indianapolis & Eastern Traction Company as roadmaster. He had been a member of the Roadmasters and Maintenance of Way Association of America since 1887.

✦

Charles A. Lux, a founder of the Rochester, Syracuse & Eastern Railway, Syracuse, N. Y., died in that city on Jan. 22. He was 70 years old. With William P. Gannon, Mr. Lux organized the electric railway, which began operation in 1905. He also helped build other interurban lines in central New York. Later he entered the water power field. His holdings on the Salmon River were sold to the Niagara, Lockport & Ontario Power Corporation.

✦

John B. Leighton, who served as claims adjuster for the San Francisco Municipal Railway System, San Francisco, Cal., from 1913 to 1926, died in that city Jan. 20 at the age of 73. Mr. Leighton was a pioneer street railway man of San Francisco. He served for many years as secretary of the old Presidio & Ferries Railroad, which in 1913 was absorbed by the Municipal System.

Digitized by Google

INDUSTRY MARKET AND TRADE NEWS

Heavy Stocks of Materials Necessary to Insure Uninterrupted Service

In order to maintain continuous and uninterrupted service on its street railway and motor bus lines which serve the greater part of Connecticut, the Connecticut Company is obliged to carry in stock in its carhouses and other storage facilities, more than 10,000 different parts and items of equipment and a number of different kinds of each. To keep this stock on hand at all times requires a continuous investment of more than $1,000,000, but the amount is necessary if the effects of wear and tear on equipment are to be offset by rapid repairs and replacements.

Chief among the items of stock carried are rails, ties, poles and trolley wire, about 100,000 ties being required each year for renewal to insure safety and riding comfort.

In the course of a year the company has to replace some 7,500 panes of car window glass, while the preservation of the appearance of its rolling equipment requires the use of about 10,000 gal. of paint and varnish. About 17,000 lb. of heavy grease and 20,000 gal. of oil are needed for lubrication. The number of electric lights burnt out and replaced on the company's equipment during a year would care for the renewals of 4,500 families, while the trolley pole rope would have furnished each family with a clothes line and each could be furnished with a new broom from the stock of the latter required in cleaning the cars.

To Hasten Work on New Subway

The Board of Transportation of the city of New York will hold a public hearing on Feb. 10 on the proposed new Second Avenue trunk-line subway route linking new rapid transit lines in the easterly part of the Bronx with another new rapid transit network in Brooklyn and Queens. The hearing will be one of a series to be held between Feb. 6 and March 19 in the board's offices at 250 Hudson Street on the 100 miles of proposed new subway routes included in the $800,000,000 project announced on Sept. 16 as the second stage of the city's subway construction program.

The Board of Transportation plans to submit definite routes to the Board of Estimate for approval this summer and expects to award about $25,000,000 in construction contracts by fall so that work may be started during 1930. The routes as outlined in the tentative program announced on Sept. 16 call for 294 miles of track and the bare construction cost, exclusive of financing charges, equipment, power and other items, is estimated at $438,000,000.

British Get Part of Buenos Aires Subway Car Order

Ira W. McConnell, first vice-president of Dwight P. Robinson & Company, Inc., New York, says that not all the equipment of the Buenos Aires subway will be of British manufacture. Mr. McConnell said: "We placed an order with a British firm for 56 cars. The reason for placing the order abroad lay in the fact that we were able to obtain the cars for 15 per cent less from British manufacturers. The entire order amounts to approximately $1,000,000. The special equipment, or most of it, is being purchased from firms in the United States.

"United States trade is maintaining its own in Argentina and home manufacturers who can prove the merit of their product are showing gains. Where there is a decided difference in price, of course, the purchasers buy abroad."

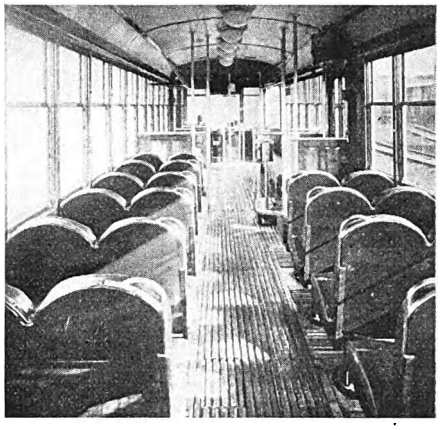
Smaller Capacities Feature Recent Bus Orders

Conspicuous among bus deliveries made during the past few weeks have been the number of units of from 18- to 23-passenger capacity, numbers of which are being ordered for de luxe and semi-de luxe service on city and intercity routes The United Traction Company, of Albany, N. Y., has added three White Model 65 buses to its already extensive fleet, while the Denver Tramway Com-

Use of Aluminum Alloys Reduces Weight of New Cars of British Columbia Electric Railway

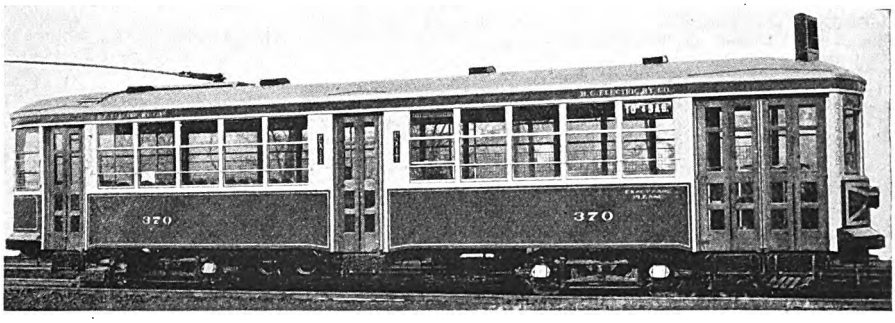
Additional details of the fifteen trolley cars recently delivered to the British Columbia Electric Railway by the Canadian Car & Foundry Company for service in Vancouver are now available. The cars, which are of the one-man two-man, single-end, double-truck type, embody certain features of structure and design which are rather unusual. Underframes consist of pressed-steel shapes and rolled-steel sections, with built-up body bolster, consisting of open hearth steel plates and cast-steel fillers. Sideframes consist of rolled-steel 3-in. by 2-in. angle side sills, tee bar posts, rolled-steel belt rails, rolled-steel angle side plates, grade 17 Duralumin side girders, with the same grade of material for letter boards.

Floors consist of two thicknesses—lower floor $\frac{7}{8}$ in. thick and top floor of $\frac{5}{8}$-in. maple, with mats laid at standing spaces. Between the floors is laid a hot waterproof composition to deaden sound. Floors are screwed and nailed to stringers which are bolted to steel members in underframe. Roofs are of plain arch design, reinforced by rolled-steel carlines and steel frame bulkheads at each body end. Roof boards are tongue and groove, covered with cotton duck, laid in white lead. Trucks are of the latest design of the Canadian Car & Foundry Company, built for standard gage, with wheelbase of 5 ft. 4 in. They are equipped with a graduated spring system, said to make for easy riding qualities, and are built with particular attention to the elimination of noise. Complete weight of body and trucks is given as 39,000 lb., and the builder estimates a saving of 1,200 lb. through the use of Duralumin. Additional details of the equipment of these cars were supplied in the Annual Statistical Number of ELECTRIC RAILWAY JOURNAL, issued January, 1930, page 63.



Rear section of Vancouver cars is equipped with upholstered forward-facing seats, while forward section, with longitudinal seats, provides ample standing capacity

When used for two-man operation both forward doors are used for entrance, with the center and rear doors, which are provided with treadles, for exits. The section of the car forward of the center door is used as a loading reservoir, the passengers paying only as they pass to the rear to take the cross seats or to leave the car. When used for one-man operation the forward section of the forward door, nearest the operator, is used for an entrance, the other section of the forward door, as well as the center and rear doors, being used for exit. If desired, the center door can be locked, in which case the rear door and the second section of the forward door would be used as exits.



Side elevation of cars recently delivered to the British Columbia Electric Railway, showing unusual arrangement of exit doors

Digitized by Google

pany and the Pittsburgh Motor Coach Company have taken one and two, respectively, of this type. Among buses of larger type to be noted in recent deliveries are five White Model 54 buses to the Omaha & Council Bluffs Street Railway, for co-ordinated service in connection with its rerouted street railway service, two buses of the same type for the Baltimore Coach Company, and one for the Cumberland & Western-port Transit Company, of Frostburg, Md. This same company has also taken delivery of a Type Z 39-passenger Yellow coach. Los Angeles Railway has received three White Model 54 buses and one Model 54A from the same manufacturer. Two White buses of large capacity have recently been placed in service by a subsidiary of the Grays Harbor Railway & Light Company between the cities of Hoquiam and Aberdeen, Wash.

Recent deliveries by the Mack-International Motor Truck Corporation include one Mack Model BB four-cylinder 177-in. chassis to the Peoples Motor Coach Company, of Indianapolis; two Model BC six-cylinder 33-passenger city type buses to the Hamburg Railway, Hamburg, N. Y.; and five Model BC six-cylinder 20-passenger buses to the Durham Public Service Company, of Durham, N. C.

American Car & Foundries Motor Company has delivered two A.C.F. 23-passenger street car type coaches to the Stockton Electric Railway, Stockton, Cal., and four all-steel 40-passenger gas-electric metropolitan type coaches to the Boston Elevated Railway. General Motors Truck Company reports delivery of one Type W city-service bus to the Erie Railway, Erie, Pa.; three Type Z 29-passenger buses to the Louisville Railway; two Type W city-service buses to the Oklahoma Railway, Oklahoma City; five Type W observation coaches to the Milwaukee Electric Railway & Light Company; and nine Type Z buses to Public Service Co-ordinated Transport.

Linde Oxygen Plant for Portland, Ore.

The Linde Air Products Company announces the opening of an oxygen plant at 60 Knott Street, Portland, Ore.

This plant, which started operations on Nov. 19, 1929, is located on a private siding on the Oregon Washington Railroad.

A. D. Davis is superintendent of the plant and D. F. Fox, whose headquarters are at 114 Sansome Street, San Francisco, Cal., is district superintendent.

R. G. Daggett, with headquarters at the same address, is division superintendent.

✦

Brooklyn Surface Lines to Be Rerouted

Plans to reroute surface lines in downtown Brooklyn at a cost of approximately $100,000 were announced recently by William S. Menden, president of the Brooklyn-Manhattan Transit Corporation, at a luncheon of the Downtown Brooklyn Association, at which transportation leaders and representative business men met to discuss the downtown district's transportation and traffic needs.

Mr. Menden said that work on the installation of new curves and switches would begin immediately. He said that the B.-M.T. proposed to make the expenditure of $100,000 to try out a scheme which might simplify the operation of surface cars in downtown Brooklyn by eliminating crossings and left-hand turns.

✦

Merger in Electric and Hand Lift Truck Field

A recent development of definite interest and importance to the materials handling equipment field is the linking together, in ownership and management, of Barrett-Cravens Company with Walker Vehicle Company, Chicago, and Automatic Transportation Company, Inc., Buffalo.

Walker Vehicle Company is an Insull company, being a subsidiary of Commonwealth Edison Company. It has purchased the capital stock of Barrett-Cravens Company, manufacturer of lift trucks, lift-truck platforms, portable elevators and structural steel storage racks.

The Automatic company is the pioneer manufacturer of electric industrial trucks and tractors, while Walker Vehicle Company is one of the oldest motor truck manufacturers, having been in business since 1903. It manufactures a full line of electric trucks for street use.

✦

Taft-Peirce Manufacturing Company, Woonsocket, R. I., has appointed Hal W. Reynolds direct factory representative in the Cleveland territory. Mr. Reynolds is experienced in the small tool and gage field. His headquarters will be at 1724 St. Clair Avenue, Cleveland, at which address he will carry a representative stock of Taft-Peirce products which include gages, tool room specialties, magnetic chucks and reamers. The territory embraced by the Cleveland office includes the northern half of Ohio.

✦

FitzJohn Manufacturing Company, Muskegon, Mich., maker of motor coach bodies, in completing its business for 1929 enjoyed an increase in sales of approximately 17 per cent over 1928 and one of the largest years in volume of business in the history of the company. Anticipating a further increase in 1930, the company has completed an 18,000-sq.ft. addition to its plant, bringing the total area for operating purposes to 74,000 sq.ft. In addition to business enjoyed during past years, in 1929 contact was made with the White and the Studebaker organizations and standard bodies, suitable for mounting on their various chassis, are now being manufactured.

✦

Hyatt Roller Bearing Company, Newark, N J., announces the appointment of H. K. Porter as general sales manager. He succeeds H. O. K. Meister, promoted to be assistant general manager of the Hyatt Company. During the past fourteen years Mr. Porter has held various positions on the Hyatt sales staff. He was assistant general sales manager prior to his new assignment.

✦

Eccles & Davies Machinery Company, Los Angeles, Cal., has been appointed sole California distributor for the sale of Krupp Widia Metal, an exceptionally tough high-speed steel. Stocks will be carried at Los Angeles for prompt service to patrons.

✦

Wagner Electric Corporation, St. Louis, Mo., announces the appointment of Major Elam as branch manager of the Minneapolis territory. Before the war he was power engineer of the Central Illinois Light Company of Peoria, Ill., and immediately after discharge from the army he again assumed that post. He joined the Wagner Electric Corporation in 1927 as a salesman in the St. Louis territory, from which position he was transferred to the Minneapolis office as branch manager.

ELECTRIC RAILWAY MATERIAL PRICES—FEBRUARY 1, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	18.00
Lead, cents per lb.	6.25
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	5.60
Tin, Straits, cents per lb.	38.75
Aluminum, 98 to 99 per cent, cents per lb.	24.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	42.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.55
Somerset mine run, f.o.b. mines, net ton	1.70
Pittsburgh mine run, Pittsburgh, net ton	1.55
Franklin, Ill., screenings, f.o.b. mines	1.45
Central, Ill., screenings, f.o.b. mines	1.95
Kansas screenings, Kansas City	1.40

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ⅞ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.15
Angle bars, cents per lb.	2.075
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.90
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.40

Hardware—Pittsburgh

Wire nails, base per keg	$2.35
Sheet iron (24 gage), cents per lb.	2.70
Sheet iron, galvanized (24 gage), cents per lb.	3.35
Galvanized barbed wire, cents per lb.	3.00
Galvanized wire, ordinary, cents per lb.	3.00

Waste—New York

Waste, wool, cents per lb.	14.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	11.00
Colored	10.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	14.4
White lead in oil (100 lb. keg), cents per lb.	14.25
Turpentine (bbl. lots), per gal.	0.59
Putty, 100 lb. tins, cents per lb.	5.725

Wire—New York

Copper wire, cents per lb.	19.875
Rubber-covered wire, No. 14, per 1,000 ft.	6.15
Weatherproof wire base, cents per lb.	18.50

Paving Materials

Paving stone, granite, 5 in., f.o.b.:	
New York—Grade 1, per thousand	$150.
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.85
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	14.00
Light copper, cents per lb.	11.75
Heavy yellow brass, cents per lb.	7.75
Zinc, old scrap, cents per lb.	3.00
Lead, cents per lb. (heavy)	4.00
Steel car axles, Chicago, net ton	$16.00
Cast iron car wheels, Chicago, gross ton	14.00
Rails (short), Chicago, gross ton	18.75
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	8.00

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

Volume 74 New York, March, 1930 *Number 3*

Public Transportation Gaining Steadily in Large Cities

MORE than 6,500,000,000 electric railway and bus passengers were carried last year by the public transportation systems in a group of ten of the largest cities in the United States, according to preliminary reports of operating companies. This figure sets a new high record for traffic in these cities. While 1929 was not a record breaking year in every city in the group, the slight recessions in some places were more than offset by substantial gains in others. The total is an increase of nearly 33 per cent over the total for the same cities ten years ago, when approximately 5,000,000,000 passengers were carried. Considering only the passengers carried on the electric rail lines the increase was a little over 25 per cent.

Cities included in this group are New York, Chicago, Detroit, Cleveland, Baltimore, Boston, Pittsburgh, St. Louis, Milwaukee and San Francisco. Taken together their transportation systems handle a substantial part of the total city transit traffic of the country. During the past decade the population of these cities, together with a few adjoining communities served by the same transportation systems, has increased about 16 per cent. Thus the growth in riding has been more than twice as rapid as the growth in population. Expressed in another way, the number of rides per inhabitant per annum has increased from an average of 330 ten years ago to about 375 at the present time. A similar trend toward increased use of public transportation facilities is evident also in other cities, but complete figures are not available at this time.

Extension of rapid transit service in New York, Chicago and Boston has played an important part in the growth of the traffic in this group of cities. It is significant, however, that substantial traffic increases have been recorded also in those cities of the group which have no rapid transit facilities.

The relative importance of bus service has been increasing steadily. Ten years ago buses carried less than 1 per cent of the total number of passengers while the electric rail lines carried over 99 per cent. Today the buses are carrying nearly 6 per cent and the rail lines 94 per cent of the total. By far the largest part of this increase in bus traffic has resulted from the development of new services, as there has been comparatively little replacement of rail service in these cities. Express and de luxe bus service, as well as local service reaching new territory, has brought additional business to the transportation systems while the electric rail lines have continued to render highly efficient service on heavily traveled routes.

That the total number of riders in public transportation vehicles has increased during the past decade in this group of growing cities is not surprising. That the average number of rides per inhabitant per annum should have shown a substantial increase, however, is worthy of note. And that this should have occurred simultaneously with the phenomenal development in the use of the private automobile is, indeed, remarkable. Better than could any words these few figures show the essential character of public transportation service.

Defining the Place of the Taxicab

SELDOM has it been possible to obtain any exact measurement of the extent to which the cruising taxi contributes to traffic congestion. For that reason the experience of the city of Pittsburgh, where a taxicab strike has been in progress for some weeks past, is particularly interesting. Notable improvement in traffic conditions has been evident since the taxicabs have been off the streets. Congestion has practically disappeared although there has been no decrease in the total number of persons entering the downtown area. This is easy to understand as counts made previous to the strike showed that more than 75 per cent of the taxicabs moving through the downtown streets were empty.

Relief of congestion has been of great benefit to both the users of private automobiles and the users of street cars and buses. The speed of all vehicles has been substantially increased and the maintenance of schedules has been greatly facilitated. The additional revenue accruing to the railway has not been a matter of any importance since the average number of persons who formerly used taxicabs did not amount to much more than 1 per cent of the railway and bus riding. But the improvement in service made possible by the elimination of the cruising cabs has been remarkable.

From this it would be easy to contend that taxicabs should be permanently banned from congested districts, but such is not the conclusion of transportation men who have been studying the situation. Rather it is thought that the strike has proved the need for regulation which will permit the taxicab to play its proper part in transportation without adding unnecessarily to congestion.

Of late there has developed a widespread tendency on the part of taxi operators to depart from the field of individual service which they are particularly well adapted to render and to encroach upon the field of mass transportation. Taxicabs cruising along lanes of heavy travel with the hope of picking up chance passengers are doing little more than duplicating existing service of street cars and buses. Not only does this add unnecessarily to the total volume of traffic on the street but it constitutes an uneconomic use of the roadway, because the number of passengers carried is

Digitized by Google

disproportionately small compared with the number of vehicles. Probably the taxicab operators have drifted into this practice almost unconsciously. The legitimate demand for taxicabs fluctuates widely. Sufficient equipment is provided to meet the maximum demand. Fares have been cut down to a minimum in most cities. Hence it has become necessary to drum up business in slack hours and the cruising cab with all its attendant evils has come into being.

To correct this situation it is necessary only to restore the taxicab to its legitimate field by eliminating cruising, establishing stands off the main streets and placing call boxes at convenient locations. Taxi service can thus be made entirely satisfactory for those who desire individual transportation, without clogging the streets with empty vehicles going nowhere.

Agencies interested in traffic regulation throughout the country have been studying the situation in Pittsburgh. Developments there are proving the soundness of many theories previously held and it is not too much to hope that the result of this experience will be a clearer understanding of the place of the taxicab and a larger degree of regulation to control its operations to the best advantage of the public at large.

Public Protection or Private Profit?

RECENT developments in connection with legislation concerning the practice of engineering in the state of New York deserve the close attention of electric railway men. On the one hand the architects' law has been changed to make it a misdemeanor for any person other than a registered architect to "design plans and specifications for structures or alterations exceeding $10,000 in cost." On the other hand, a proposal has been made to amend the engineer license law in a way which might make it necessary for track foremen and substation operators to hold engineers' licenses. The potential danger in these regulations is too serious to be ignored.

When these laws were first enacted some years ago, the avowed purpose was to make sure that the designers and builders of important structures should be competent to perform their work. Consistent efforts have been made, however, to convert the laws intended for the protection of the public into instruments for improving the financial condition of architects and engineers by restricting the performance of certain jobs to a limited number of officially authorized persons. Many engineers, however, being wholly out of sympathy with these efforts, have refrained from applying for licenses. Thus it has become a common practice of corporations doing engineering work to have one license holder sign all such plans and designs as require the signature of a licensed engineer. To a considerable extent this practice has defeated the original purpose of the law.

It is now proposed to correct the situation by defining an engineer as one "who engages in, or who holds himself out as able to engage in—the designing, the preparing and filing plans and specifications for, the supervising and inspecting of—structures, machines, processes and (or) other engineering work or appliances involved in public or private projects, the safety and control of which are essential to the public welfare." Just how far-reaching this amendment would be in actual practice is difficult to foretell. Nevertheless it is evident that it might easily be interpreted to include a large number of persons whose work is in no sense real engineering. Sufficient opposition to the new definition has developed, however, so that its adoption at this time appears improbable. Efforts to amend the law so as to place engineers on an equal footing with architects as regards structural design appear more likely to succeed.

Whatever the feeling of individual engineers may be concerning these license laws, their existence is a condition and not a theory. They are in effect in some 26 states, in several of which trends have been evident similar to those in New York. Undoubtedly there is need for correcting certain conditions now existing. But care must be exercised to see that the cure is not worse than the disease. It would be easy to go too fast and too far with changes in the present law. Rather than remain aloof because of their disapproval of these developments, all engineers should participate and help steer them so that the rights of engineers shall be adequately protected without extending the scope of the law to cover too broad a field.

Co-ordinated Transit Makes Progress

WHEN a community passes from the small city stage to that of metropolitan center a demand comes for transit of a different kind from that which was satisfactory before. People do not all want to reach one central point, and a radial system breaks down. This is particularly true because of increasing street traffic congestion. Even higher schedule speeds, while essential, will not alone compensate for wrong methods or indirect routes. Accordingly, some form of co-ordination in which all the available means of transit are used to best advantage is necessary to the continued growth of the community.

The latest city to follow this course is Rome, Italy. Beginning with the first of this year a radical change was made. Outlying routes of street cars were consolidated and now feed into a belt line surrounding the central part of the old city. On account of crooked, narrow streets, all cars have been excluded from this area and buses are used to furnish such distributing service as may be necessary. Crosstown passengers transfer to the belt line and do not enter the congested district at all. This system replaces the one that was in use for many years. A multiplicity of street car routes, most of them with infrequent headways, reached many destinations, and nearly all of them ran through the most congested portions of the city. Buses supplemented the service, principally in the outskirts.

To complete the new system a subway has been planned. When completed—it will take several years to build—it will give direct routing to central points, with schedule speeds that cannot be approached by surface transportation. It is to be presumed that a further rerouting of surface lines will be possible when the subway is built.

In some respects the new system in Rome resembles that built up in the Boston area in this country. Rapid transit plays a large part in the success of the Boston system. Surface routes, for the most part, are local in character and terminate at the nearest rapid transit stations, where transfer is made to one of several trunk lines passing through the center of the city underground. Such surface cars as do enter the heart of the city do so in subways and terminate at locations convenient to the most important points.

London also has a system which is not unlike these two. In one respect it more closely resembles the new

Digitized by Google

Rome system—surface cars are excluded from the central area and buses furnish all the service. Here again there is the problem of crooked, narrow streets. There is a comprehensive network of subways such that the passenger from the outlying districts does not need to use the surface routes at all. The buses should be of chief advantage to the short rider who does not leave the central area. However, most of the routes radiate out for several miles. As a consequence there are many buses on the streets and the congestion has become so great that movement is very difficult. The function of the buses for local riding is all but defeated. In this respect the Rome plan is superior, although it involves a transfer for anyone who travels between the suburbs and the center of the city.

Such a plan as the one just started in Rome is bound to be watched with interest. It is too early to pass judgment on it until more definite results can be had than are available after a trial of a few weeks. In fact, it is not possible to determine the full value of the plan until it is rounded out with the completion of the subway system, and operation of that cannot begin for several years at the very least.

A Study in Financial Fortitude

ANOTHER electric railway has been reorganized on a basis that gives every reason to believe it will meet successfully the new economic conditions. The road is the Chicago, South Bend & Northern Indiana Railway and its affiliate, the Southern Michigan Railway. The history of what has been done with it financially is reminiscent of the suggestions contained in the report of the American Electric Railway Association's committee on finance made some few years ago. Whether or not those responsible for the reorganization had in mind the recommendation of the committee on finance of the association is not disclosed, but the process of procedure followed the committee's recommendation and the successor company has emerged with a financial structure which does resemble the typical one suggested.

Significant, indeed, is the fact that the reorganization was not voluntary. Only occasionally can security holders be made to see the value of voluntary action under the theoretically sound doctrine of the greatest good to the greatest number. This was not one of those rare occasions. So the stage was set for the auctioneer and his hammer.

But that is said and done. To recapitulate the financial set-up here is not necessary. It is important, however, to note that the Indiana Railway first mortgage of $426,000 emerges as an extended obligation to be amortized out of current earnings within six years. When that has been done the funded debt will be $1,533,085. Meanwhile treasury bonds will be issued to finance additions and extensions and the equipment trust method will be called into use to finance the purchase of ten new city cars and ten new interurban coaches. Again obligatory amortization out of earnings will tend to keep the structure of bonds within the reasonable earning capacity of the property. Accrued interest on other bond issues has been cared for by additional evidences of indebtedness.

All in all, the new structure has been so arranged as to make it possible to continue operation on a basis that will attract capital and credit and permit the properties to be properly rehabilitated. The successor organization is regimented financially for a gait fit for the economic company in which it finds itself, not for the step of the wooden soldier. The facts are a study in financial fortitude.

Municipal Operation Not Immune from Economic Law

CASH fares on the Detroit municipal railway will go from 6 cents to 8 cents on March 15 and cash bus fares from 10 cents to 8 cents. The ticket rate on cars has been nine for 50 cents, but will become four for 30 cents or ten for 75 cents for use on either cars or buses. These changes follow the determined stand of Mayor Bowles to the effect that the railway shall meet, in fact as well as spirit, the mandate of the charter that it charge a rate of fare adequate to pay its debt obligations and at the same time provide current maintenance money sufficient to keep the system healthy.

Apparently the Mayor had little cause for dissatisfaction with the system as it was being run. But he was not satisfied that the fares were sufficient to provide out of earnings for the orderly development of the system to meet the expanding requirements of the city. So he asked John H. Morgan, auditor to the system, to report to him. The principal source of trouble, Mr. Morgan said, was that the rate of fare had never been sufficiently high to produce revenue to pay all necessary obligations as provided by the city charter.

If the Mayor was not prepared to recommend one way or another about fares when he took office, Mr. Morgan's statement removed the last iota of doubt from his mind. The street railway commission then backed him up. It voted two to one for the increase. Frank Couzens, son of Senator Couzens, under whom municipal ownership was brought about when the latter was Mayor of Detroit, was the recalcitrant. He is understood to have taken the position that the alleged neglect in the past to provide funds sufficient for depreciation was no reason why fares should be advanced now. But they are to be advanced. They are to be advanced because the municipal railway is no more immune from the play of the economic forces around it than are the private companies operating under comparable circumstances. This, the most recent operating statistics prove.

For twelve months ended Jan. 31, 1930, the net profit on the municipal lines was $106,576 after charges, taxes and sinking fund requirements, compared with a net profit of $399,873 in the preceding twelve months. That is not much to brag about under the circumstances. As for the future, if there is no decrease in traffic and several other if's prove to be correctly diagnosed, gross revenue should increase by $3,000,000 for the current year over that for the one recently closed. Other phases of the matter are reviewed elsewhere in this issue.

Meanwhile, $8,760,322 will be needed by June 31, 1931, for new equipment, extensions and repairs. The 1930-1931 budget sets up a bond issue of $7,000,000 to take care of the major part of this cost. If General Manager Smith has his way, 100 new cars and 75 buses will be purchased at once at a cost of $2,225,000. He also feels that a similar number should be purchased during the 1930-1931 fiscal year. Detroit really needs them. Of that there is no doubt. To buy them the railway will have to pay real money, and the Mayor intends that the city shall get that money from the people who use the service.

Digitized by Google

Traffic Officers as

Transportation Men

By
CLARENCE P. TAYLOR
Assistant Traffic Engineer Department of Public Works
Commonwealth of Massachusetts

Promoting safe, orderly and expeditious use of the streets is the primary function of police traffic officers. They should approach the problem from the standpoint of transportation rather than that of law enforcement

ENFORCEMENT duties of traffic officers should be incidental to their primary functions of promoting safe, orderly and expeditious use of the streets and highways. A traffic officer should be more of a transportation man than an enforcement officer. The failure of some officers to grasp this point of view cannot be properly charged against them as individuals. The fault lies deeper. The rapid growth in the size and complexity of travel created baffling problems of automobile fatalities and traffic congestion. No precedents were available for meeting the difficulty, nor did time permit customs to evolve or best practices to develop. As a result it was only natural to try legislation as the first "cure." Certain acts and omissions were made crimes and the whole problem thereafter turned over to the police to struggle with as best they could.

Previously policemen dealt chiefly with vicious criminals, or at least with definitely anti-social persons, and seldom had to bother with forgetful and careless citizens. The situation now is that, according to law, both traffic law violators and burglars are criminals. Hence, is it any wonder that men who have spent a large portion of their lives handling hardened criminals should have difficulty in adapting themselves to the handling of a totally different class of law-breakers?

The traffic problem might have been given to railroad men to solve. Indeed, such an assignment would have been quite logical. Perhaps, if this had been done, the railroads with their superior experience in the transportation field and their special facilities might have been more successful than the police. Police departments had no men who were trained and able to do the necessary research and engineering work. They had no staff of men experienced in the training of the public mind. They had no funds with which to promote the needful enterprises. All that the police had was a large fund of knowledge and experience in the handling of criminals. Considering the handicaps, it is a wonder that any progress has been made.

The police officer, as a controller of traffic, is becoming an expert in the management of people and vehicles

Not only has the problem of the regulation of traffic

Digitized by Google

been a source of much trouble to the police, but in size it now bids fair to eclipse that of crime. Many chiefs of police find that more than half of their own time is spent working on traffic problems and that if the public were to have its own way all of the policemen would be on traffic duty most of the time.

The police were among the first to recognize the special nature of street traffic control. As a result, all of the foremost police departments have traffic bureaus or divisions to which all traffic functions are attached. This specialization has been furthered by the advent of the local traffic engineer, who takes charge of the engineering features of street traffic, and the local safety council, which disseminates safety education. When these two agencies are active it is possible for a traffic division to concentrate on enforcement.

Enforcement, however, has come to have a broader meaning than the apprehension and prosecution of law violators. In traffic, it no longer stands for wholesale arrests, but for the performance of those duties which will best promote safe, orderly and expeditious use of the existing street surfaces. Such a conception of a traffic officer's purpose may be less definite than one which prescribes the arrest and prosecution of all offenders, but it is certainly more apt to produce the results which legislators sought when they passed traffic laws.

Quarrelsome Disciplinarians Disappearing

Traffic officers still vary considerably in their notions of how they should conduct themselves and what they should expect from the public. A change for the better is observable as the blundering, officious type is being displaced by men who are both efficient and pleasant. The latter are experts in the management of people and vehicles and not quarrelsome disciplinarians.

When viewing the traffic officer as a transportation man one finds some striking similarities between the duties which he performs and those of railroad men. A railroad switchman, in an interlocking tower where two lines cross at grade, signals approaching trains so as to prevent conflicts and collisions. A traffic officer directing traffic at an intersection does the same thing for vehicles. A train dispatcher decrees that certain trains shall wait for others and gives the most important trains the preference. Also, he sees that there is ample time in the schedule for the necessary movements to be made in safety; so, too, with a traffic officer when he sets the timing of traffic signals. To the main flow of traffic he gives the most time and the advantage of progressive movement in trains if possible. He also allows a short interval after stopping the traffic on one street to permit the last few vehicles to clear before a signal to proceed is given the traffic waiting to cross.

A railroad general superintendent has many executive functions that are not analogous to the duties of a traffic officer, but his principal objective of keeping things moving is the same. While such a superintendent is directing his attention to congested lines and idle rolling stock, traffic officers are looking after congested streets and automobiles that are parked overtime.

When a parade or caravan is to pass through a city the traffic officer often plays an important part in assembling and running it. In the work of making up the procession does he not do something very similar to what a yardmaster and switching crew do when they make up a train? As soon as the procession is under way he is generally charged with seeing that the correct routes are taken, that the schedule is kept, and that all necessary precautions are taken for the safe and uninterrupted movement of the column. In this rôle his responsibilities are obviously like those of a conductor.

In both fields a certain amount of police work is required. But as the work of the railroad police is small compared with that of the whole organization, so, too, should the arrests and prosecutions by traffic officers constitute a small part of their total efforts.

Both the railroad safety engineer and the traffic officer are employed to prevent accidents without unduly interfering with transportation. The work of each involves the investigation of traffic hazards and the taking of appropriate action toward the elimination of dangerous conditions. In fact, a traffic officer should be guided by the same principles and practices as are followed by safety engineers.

These few examples of similarity between some of the work done by railroad men and that performed by traffic officers may help to make it clear why it is desirable that a traffic officer should be more of a transportation man than an enforcement officer. In the capacity of a transportation man a traffic officer would serve the public by keeping things moving and by working diligently and intelligently to prevent accidents. On this basis the value of an officer would not be measured by how large a number of arrests he made or how large the gross receipts from fines were but by how few people he arrested, coupled with how smoothly and efficiently he kept traffic moving, how few accidents occurred and how few complaints were made about traffic conditions or the officer.

Training Efficient Traffic Officers a Problem of Personnel Management

To train a group of traffic officers to work efficiently is a difficult problem, and one in which the details vary with each individual department. However, assuming that a particular traffic division is well organized, political interference small, and new men selected carefully for their fitness, the problem resolves itself chiefly into one of management of personnel. The practice of sending men out to handle traffic without a single instruction, other than where they are to go, is proving too costly to continue. Uniformed officers make numerous mistakes and sometimes irreparable blunders. The time required for their superior officers and the courts to straighten out case after case of avoidable error is sufficient ground for some educational effort. And when to this is added the wasted time of the officer himself as well as that of clerks, attorneys, witnesses, juries and defendants, the need is apparent. Moreover, a difference in the accident and congestion situation may properly be a debit against an incompetent officer.

One of the basic principles of good management is that the worker should be instructed thoroughly in what he is to do. For this purpose, Baltimore, Boston. Detroit, Los Angeles, New York and many other cities have training schools for traffic officers. Several states, some counties, and a few universities, too, have joined in the movement by offering special opportunities to ambitious officers. The rapid growth of associations of traffic officers is indicative of a general desire on the part of traffic men themselves to learn from the experiences of each other. It is also true that each year sees a greater number of traffic officers visiting in different parts of the country in order to see first-hand how things are done in other cities. It is important that electric railway men know of these movements in order that they may

Digitized by Google

encourage them in their own localities, for these are some of the best means for training traffic officers.

A well-rounded course of instruction should include a working knowledge of police practice, criminal investigation, law and psychology. Special effort should be made to teach the practical details connected with the characteristics of traffic flow, the handling of traffic at intersections, enforcement of parking regulations and other important traffic rules, handling of violators, handling of crowds and processions, the proper procedure at fires and major disasters, the testing of brakes and headlights, the prevention of accidents, the investigation of traffic hazards, the investigation of accidents, the proper procedure and conduct in court and the way to get along congenially with fellow officers, other departments, the press and the general public.

No modern business enterprise would attempt to direct its employees without some form of supervision; yet there are still many traffic divisions in which there is little, if any, check for determining the extent to which orders are obeyed and policies carried out. Every squad of traffic officers needs a field supervisor to show them how their work should be done, to see that it is done according to instructions, and to see that there is sufficient work planned ahead to keep them busy. In the office, it is vitally necessary to keep track of each officer's assignments, to see that they are attended to.

But officers cannot do their best work unless they are in a favorable frame of mind. The cultivation of good morale is perhaps the most difficult task that any chief faces. Success can come only when a chief is able to demonstrate leadership and unflinching fairness. In addition, there should be allotted to each man sufficient work to keep his mind constantly occupied. Ambitious men want to get ahead, and unless consideration is given to them they may leave the department or spread dissatisfaction. Increase of pay, special details on difficult cases or problems, promotions and recommendations to executive positions in other traffic departments are means of keeping this class of men happy in their work. Politics, always a disturbing element, should not be permitted to interfere in the appointments or the work of a traffic division. Every reasonable means should be taken to make the work interesting to the men.

Modern business methods of managing personnel must be adopted to make traffic officers efficient transportation specialists. Such methods will be selected not just because they are used in the best-managed businesses, but because they are right and will yield great benefits to the traffic officer, his department and the public.

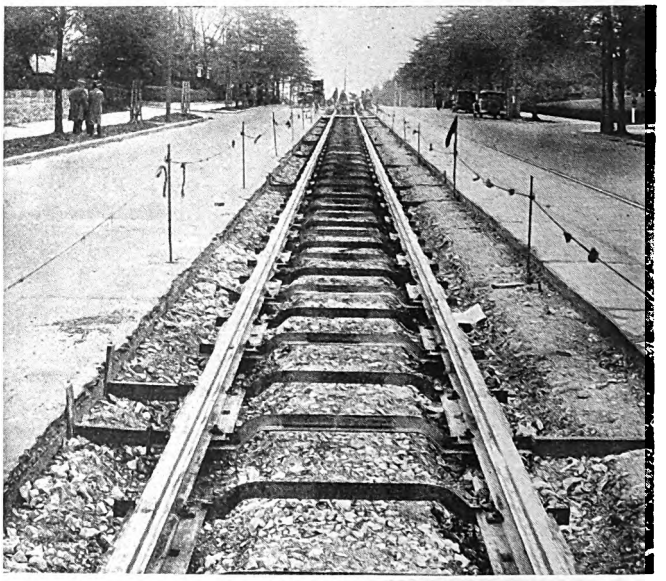
New Track Construction Methods Prove Speedy and Economical

By R. H. Dalgleish
Chief Engineer Capital Traction Company, Washington, D. C.

BY THE adoption of a new track design in which bent steel ties are imbedded in monolithic pre-mixed concrete, delivered by truck and thoroughly tamped and vibrated by special power-driven apparatus, the Capital Traction Company, Washington, D. C., has found it possible to lay track faster and more economically than in the past. In May, 1929, the company rebuilt 3,104 ft. of surface track by the new method. This track has now been in operation about eight months, during which time the temperature has ranged from zero to 100 deg. F. A few lateral cracks have developed, but there is no indication of any separation between the rails and concrete. The results obtained are considered so satisfactory that it has been decided to standardize on this method of construction until some better one is developed.

The design consisted of 103-lb., A.E.R.E.A. 7-in. grooved girder rail installed on a new type International twin steel tie, thermit welded joints, and monolithic concrete pavement from below the ties to grade. The original track had been constructed on a 9-in. crushed stone bed, which was not materially disturbed in the reconstruction work. The new type steel tie, which is bent upward in the center, reduces the amount of excavation necessary as compared with that of the straight tie by about 5 cu.yd. per 100 ft. of track, with of course a corresponding decrease in the amount of concrete. At the same time it provides for an ample depth of concrete in the center of the track to take care of vehicular traffic.

Ties and rails were installed in the usual way, but as the concrete was placed the entire track structure was vibrated by means of a machine with two pneumatic hammers, mounted on a piece of channel iron in such a position that each hammer operated over a block of steel placed approximately over the lip of the rail. A thorough machine tamping of the concrete was followed immediately by the vibration treatment. The result was extremely interesting. Air bubbles could be seen along the rails for a distance of 5 ft. ahead of the machine, clearly proving that what had been previously considered well-tamped concrete, in reality contained many voids. The vibrating machine was moved along the rails about a foot at a time. In addition to a very dense concrete with a perfect bond around rails and ties, the treatment also brought the mortar to the surface so that a good finish was obtained easily.

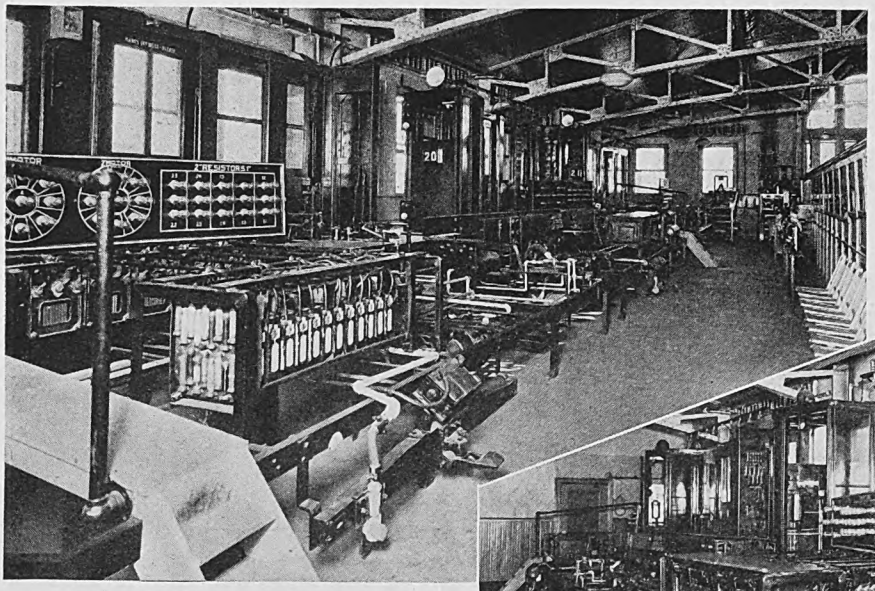


This type of track structure installed by the Capital Traction Company on Connecticut Avenue has now been adopted as standard

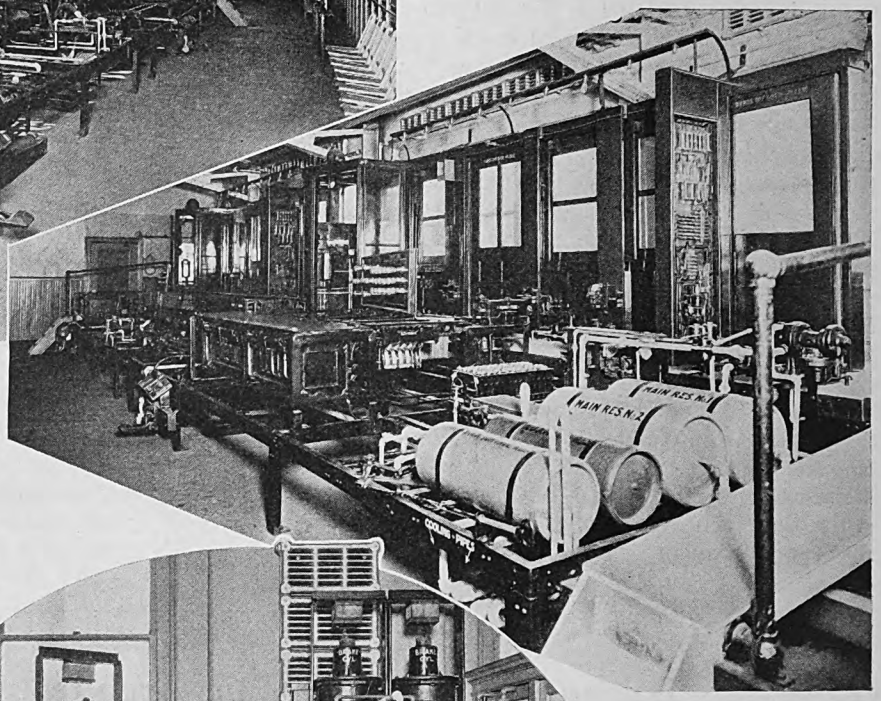
It might be thought that the cost of excavation neces-

Digitized by Google

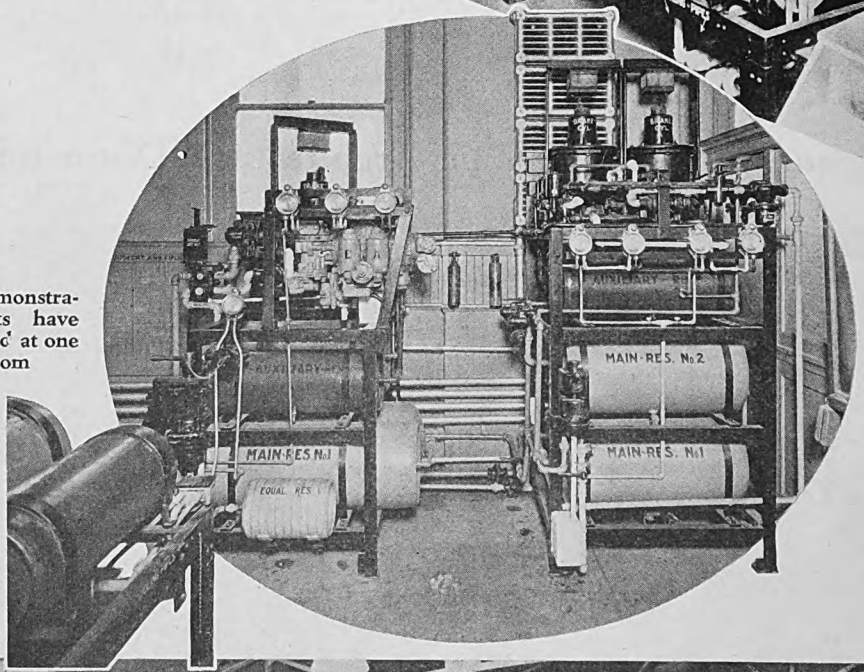
Digitized by Google



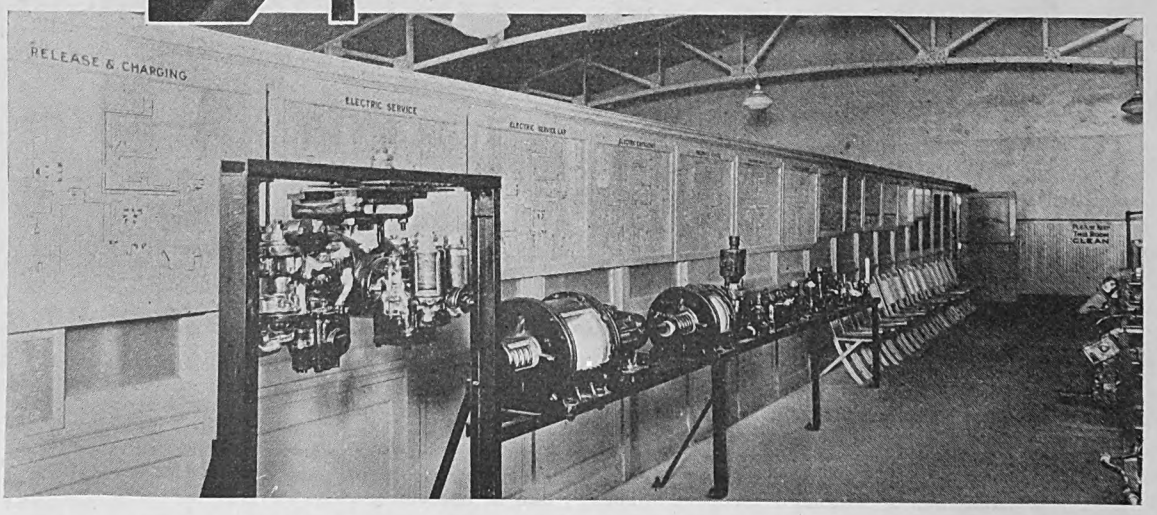
Interior of new instruction school in trainmen's room of 69th Street Terminal



Set up of equipment used on one type of rapid transit car

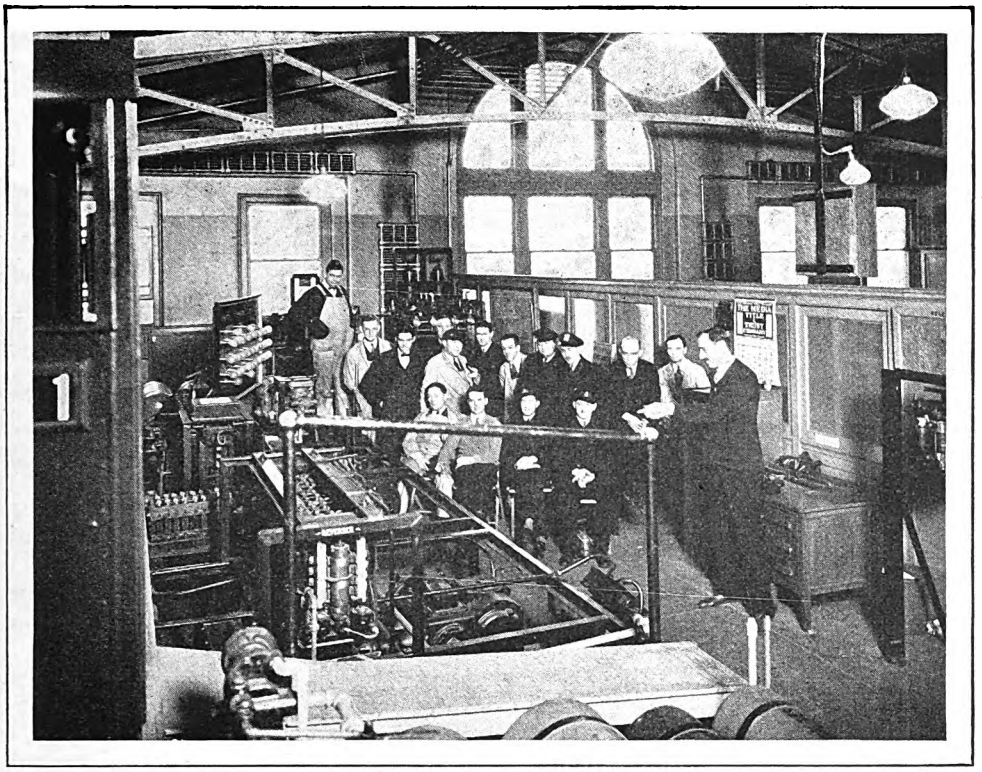


Brake demonstration racks have been placed at one end of room



Walls are covered with charts and diagrams. Cut sections of individual pieces of equipment are mounted near by

Digitized by Google



Philadelphia Rapid Transit trainmen receiving instruction in mechanical and electrical details of subway-elevated equipment

Operating Delays Reduced

By Practical Instruction Methods

By

L. E. Summers

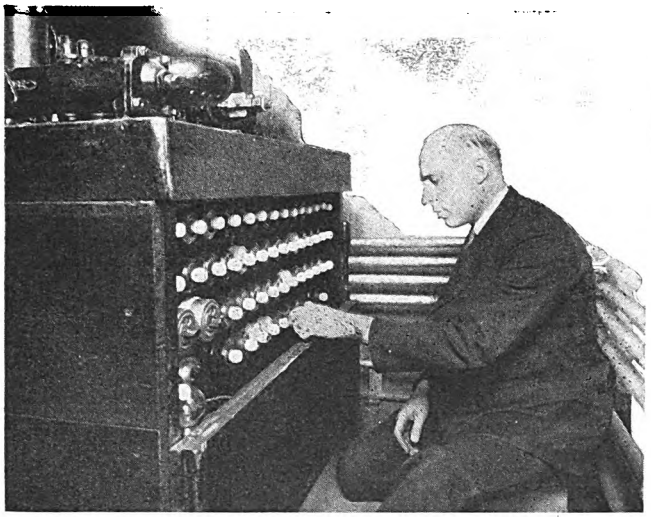
Assistant Operating Manager Elevated Division
Philadelphia Rapid Transit Company

P.R.T. management has found that almost all mechanical or electrical defects which develop in service can be temporarily corrected by trainmen if they are thoroughly familiar with details of equipment

DELAY of a few seconds to a rapid transit train leaving one end of the line may easily develop into a ten- or fifteen-minute "drag" before the completion of the trip, and a delay of a few minutes duration as the result of a slight mechanical failure is almost a calamity. It is of the utmost importance, therefore, that each train, when leaving the yards, be as mechanically fit as possible. The track, signal and electrical equipment must be in almost perfect condition, and the employees must be intelligent, alert and resourceful. As a means of developing these characteristics in its subway-elevated men, PRT recently completed the installation of a new instruction department, located in the trainmen's room at the 69th Street terminal of the Market-Frankford subway-elevated line.

The instruction policy of the management, in so far as its subway-elevated employees are concerned, is based upon the premise that practically any mechanical or electrical defect in rolling stock which may develop in service can be temporarily corrected by the motorman or conductor, provided he has been carefully and thoroughly instructed in the details of the equipment he is operating. Although yard inspections and repairs are conducted with the greatest care, it is not possible to eliminate entirely the possibility of a defect's occurring when the

Digitized by Google



Manipulation of this switchboard by the instructor will produce symptoms of any ordinary type of electrical or mechanical failure

train is in service. In order to minimize the difficulties arising from such occurrences, PRT has carried its instruction program into great detail.

The trainmen's room was decided upon as the ideal location for the instruction department, since this room serves as the gathering place for motormen and conductors with spare moments before, after or between runs. There is no doubt that convenience has played an important part in arousing the interest of the trainmen in their school.

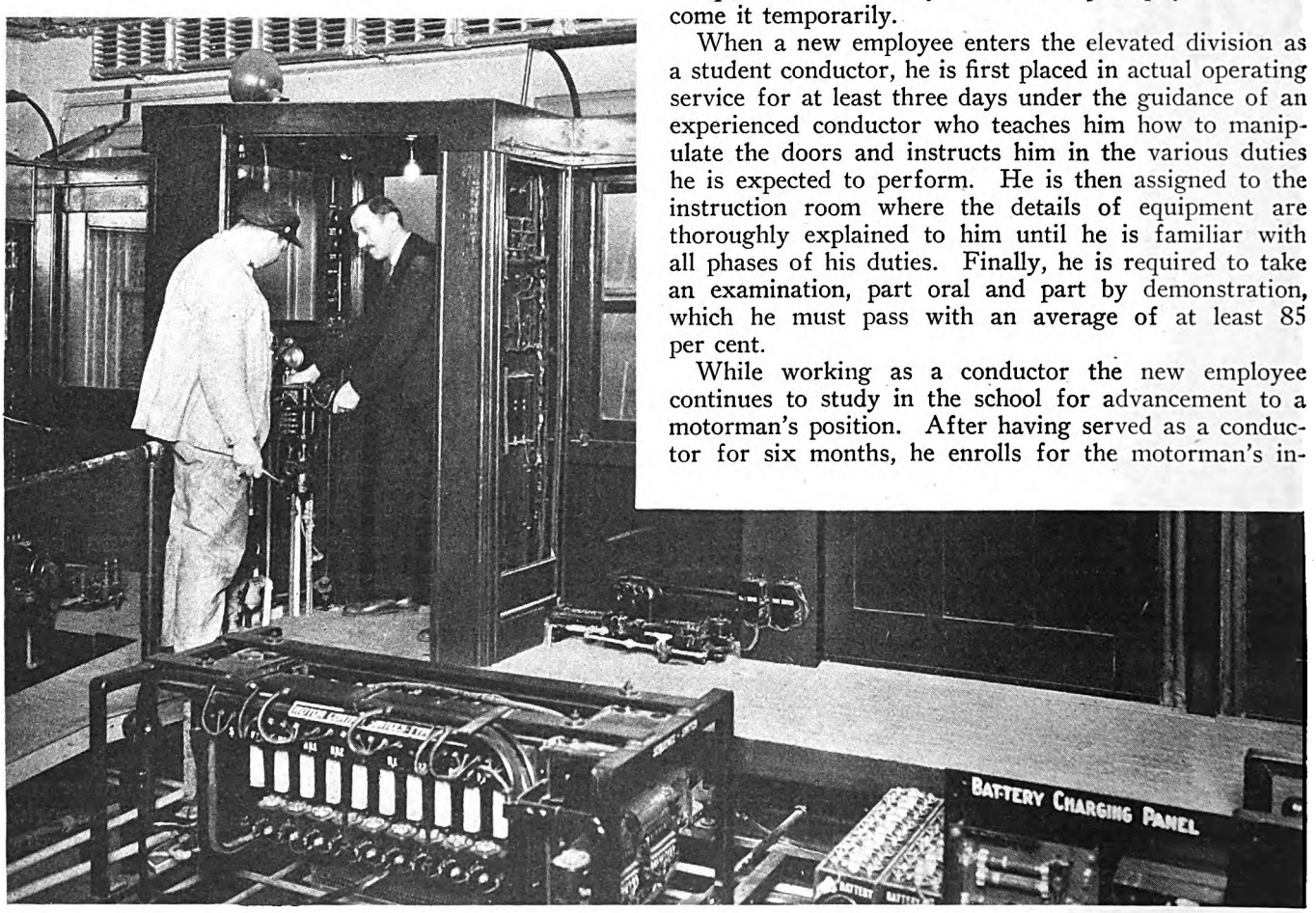
In the instruction room are sections of three full-sized subway-elevated cars, placed end to end and stripped of ceiling, seats and floor. One side of each car has been removed for purposes of clear vision. In all other respects they are similar to those in regular service. Rolling stock on the Market-Frankford line consists of two types of cars: the older Market Street cars, equipped with GE Type M Control and Westinghouse electric-pneumatic AMRE brake equipment, and the more modern Frankford cars equipped with Westinghouse Type ABF control and Westinghouse electric-pneumatic AMUE brake equipment. Thus two types of instruction equipment are required.

A completely equipped motorman's cab has been set up. Doors, door controls, and every air pipe, coil, valve, wire, etc., in and under the body of the cars are exposed to view. Air pipes and reservoirs are painted in different color schemes for purposes of easy identification and explanation. Two brake demonstration racks stand side by side at the end of the room. A complete set of movable couplers is provided to show the trainmen how to couple and uncouple cars. Walls are covered with charts, diagrams and blackboards.

An especially interesting feature is a device whereby the instructor, through manipulation of a switchboard located in the far corner of the room, can produce in the equipment of the cars the external symptoms of practically any failure likely to occur in actual operation. The student, standing in the cab, is assigned the task of determining and temporarily correcting the difficulty. Every defect which might occur in actual operation is manufactured for him, and he is rigidly instructed in the procedure necessary to locate it promptly and overcome it temporarily.

When a new employee enters the elevated division as a student conductor, he is first placed in actual operating service for at least three days under the guidance of an experienced conductor who teaches him how to manipulate the doors and instructs him in the various duties he is expected to perform. He is then assigned to the instruction room where the details of equipment are thoroughly explained to him until he is familiar with all phases of his duties. Finally, he is required to take an examination, part oral and part by demonstration, which he must pass with an average of at least 85 per cent.

While working as a conductor the new employee continues to study in the school for advancement to a motorman's position. After having served as a conductor for six months, he enrolls for the motorman's in-



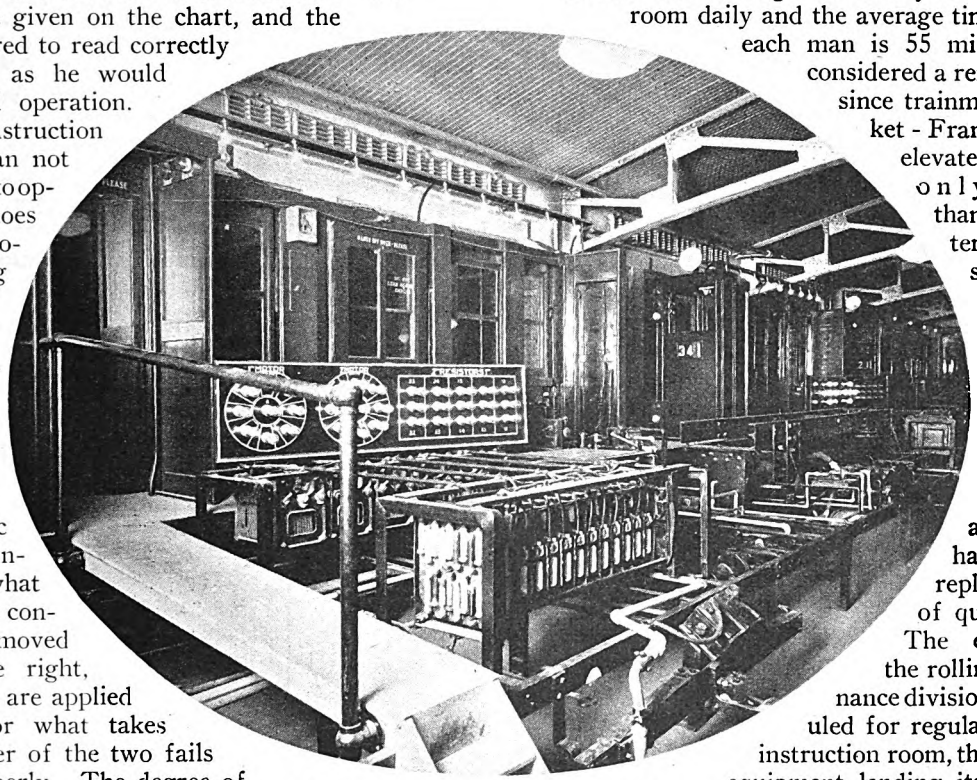
Motorman receiving individual instruction in brake valve operation

Digitized by Google

struction course. This course consists of one week's actual study of train operation under a motorman instructor. The student is next given instruction on cars in the yard, followed by an examination which he must pass with an average of 85 per cent. The minimum time in which a student may complete this course is eleven days. Instruction is given individually or in groups as occasion and convenience dictate, and by demonstration or lectures.

A chart on which are shown types of signals in use, with their various positions and indications, is used in the examination and instruction of trainmen. No explanations are given on the chart, and the student is required to read correctly each indication as he would see it in actual operation.

Thus, in the instruction room, a trainman not only learns how to operate a car, as does the average motorist receiving instructions for an operator's license examination, but, he learns his lessons to the extent and in the sense in which an auto mechanic learns his. Trainmen can see what occurs when the controller handle is moved to the extreme right, when the brakes are applied and released, or what takes place when either of the two fails to function properly. The degree of thoroughness to which this instruction procedure extends may be illustrated by the fact that the examination for motormen contains a list of 83 questions and that for conductors 35 questions. Not only must new men survive this rigid examination, but all employees must go through the instruction school once a year for brushing up purposes, submitting to the same examination as the beginners, and passing it with the same average. Should either a new or an old man fail to pass the quiz, he is required to attend the instruction school until he has satisfactorily shown his ability to master the questions.



Lights indicating motor and resistor circuits show students where current goes as the various contactors are actuated by controller and sequence switches

Should a motorman or conductor be the cause of an unnecessarily long delay or, as a result of continual checks by members of the instruction department, be found deficient in any point of operation, he is sent to the school for additional instruction. Not until he has clearly demonstrated his ability to prevent a recurrence is he allowed to return to his train. These checks cover the manner in which a motorman stops and starts his train, with particular attention to smoothness and rapidity; the degree of accuracy he maintains in his running time schedules; his response to unexpected signal tests; the conductor's carefulness and time in opening and closing doors and the behavior of both members of the crew in an emergency.

Records of trainmen's voluntary attendance at the school give the best indication of the interest displayed. The instruction room, open seven days and two evenings each week, has supplanted the outside trainmen's room as the gathering place for motormen and conductors during their spare moments. Idle chatter and newspaper reading have given way to pipe line and valve discussions, as men bend over the car "chassis" and pump question after question at the instructors. One motorman, for instance, made 23 visits to the instruction room in the course of a month, spending 61 hours and 35 minutes among the reservoirs and brake demonstration racks. An average of twenty trainmen visit the room daily and the average time consumed by each man is 55 minutes. This is considered a remarkable record since trainmen on the Market - Frankford subway-elevated line number only slightly more than 170. Superintendent of Instruction Harry Keely and Instructor Frank James, who are largely responsible for the organizing and development of the department, are frequently hard pressed for replies to a barrage of questions.

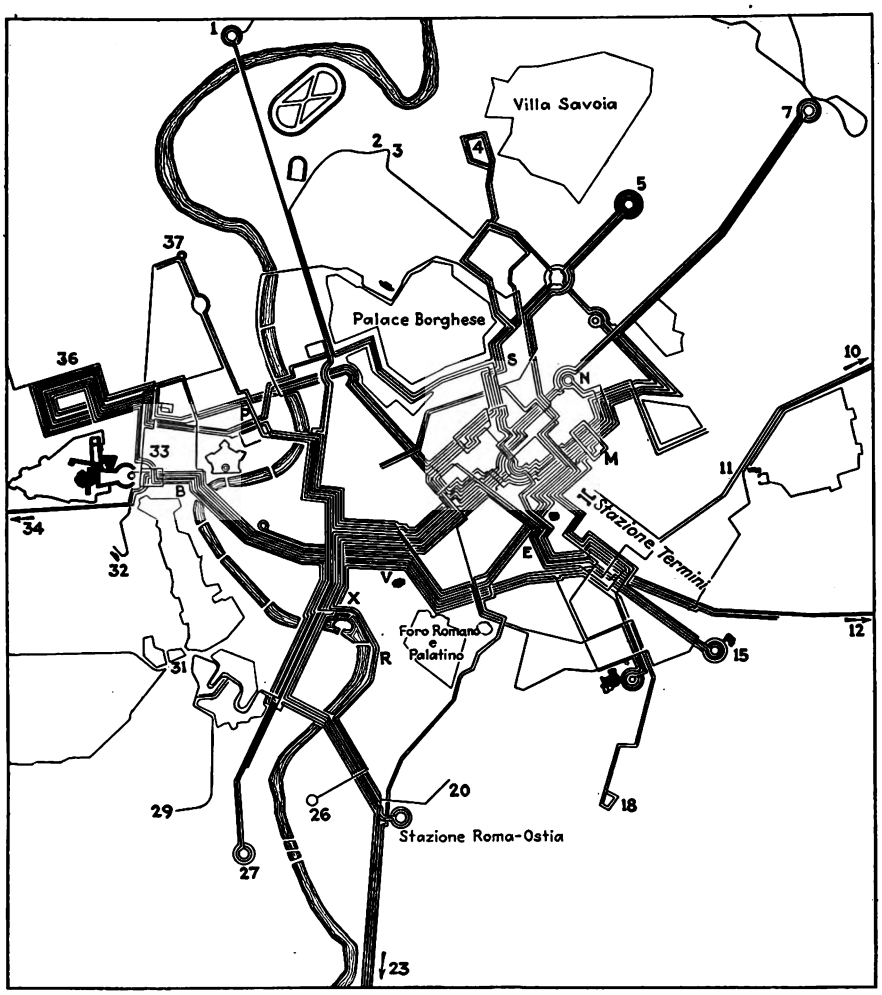
The employees of the rolling stock maintenance division are also scheduled for regular periods in the instruction room, the demonstrating equipment lending itself in an ideal manner to study by these men responsible for inspection and maintenance of rolling stock. Their course of instruction naturally varies in some degree from that of trainmen. Classes for electrical and air brake maintenance employees are conducted each year from September to June. Air brake employees, in the first part of their course, are instructed in the theory of the equipment in the instruction room, each man being required through use of charts and actual equipment to follow the course of the air through all the pipes, reservoirs, valves, etc., explaining the functions of each, and "shooting trouble." These men are then taken into the shop and required to demonstrate their ability in determining and correcting defects in the various valves in the complete brake equipment. Employees working on electrical car equipment are divided into a primary and an advanced group. Their classes are held one night a week in the school, for instruction in the theory of all electrical equipment and for training in locating and repairing trouble.

The remarkable interest on the part of all subway-elevated men has been directly reflected in the delay sheets. Long delays on the line have been considerably reduced as a result of these instruction methods. Experience has proved already that the voluntary visits which the men pay to their school make the routine examinations practically nothing more than a matter of form.

Digitized by Google

Rome Readjusts Car and Bus

Street cars replaced by buses in business district. Unified transfer system between car and bus. New belt line affords direct communication among districts outside of business area. Special work necessitated by new system installed in four hours. Sightseeing with buses encouraged by municipal transportation system



When street cars went through the business district before lines were taken out of this area, traffic was slowed down considerably due to congestion in narrow streets

1—Piazza Ponte Milvio
2, 3—Acqua Acetosa
4—Villa Vellicelli
5—Piazza Verbano
7—Monte Sacro
9—Q. Itala
10—Portonaccio
11—Campo Verano
12—Acqua Bullicante
15—Santa Croce
16—G. Appio
18—Porta Latina
20—Santa Saba
23—San Paolo
26—Testaccio
27—Staz. Trastevere
29—Monte Verde
31—San Pancrazio
32—San Pietro
33—Vatican City
34—Porte Braschi
35—Santa Maria Pieta
36—Trionfale
37—Piazza Bansizza
B—Ponte Vittorio Emmanuele
C—Piazza Colonna
E—Santa Maria Maggiore
F—Piazza Flaminio
M—Piazza Indipendenza
N—Piazza Pia
P—Piazza Cavour
R—Piazza Bocca Verita
S—Piazza Fiume
T—Piazza Garibaldi
V—Ponte Venezia

COMPLETE rerouting of all street car and bus routes in the city of Rome was effected Jan. 1 of this year. The outstanding feature of the rerouting is that all street cars are excluded from the center of the city, service in that district being given by a number of short bus routes. A double-track street railway belt line surrounds this area and serves as a means of transfer from one route to another. Car and bus routes radiate from this belt line to the outer districts of the city, and several outlying crosstown lines make transfer between the outer districts of the city possible without entering the center.

The plan has been worked out in anticipation of the construction of a subway system which probably will be completed within the next six or eight years, and will give a series of through routes from the outer portions of the city to the principal railroad stations, going underneath a portion of the central district.

For a number of years the transportation lines in the city have been controlled by the municipality through an organization known as the "Azienda delle Tranvie e Autobus del Governatorato di Roma" (A.T.A.G.), but no previous plan has been worked out for a co-ordination of the various means of transportation. The original companies which preceded the municipal consolidation were privately owned and had been consolidated into one system, following the conversion from horse to electric traction many years ago. In 1911 the municipality organized and constructed a small railway system, principally in the outlying districts. Due to the war this system was only slightly expanded, but in 1920 when most of the franchises of the private companies expired, the lines were taken over by the city. The inefficiency of the old transportation system then became apparent and in 1923 plans were begun to rehabilitate and consolidate the lines. These plans have been modified several times and have culminated in the system which has just begun operation.

The main purpose of the consolidation of the street car systems was to facilitate transportation among the various sections of the city and to eliminate transferring from one system to another. While the service was adequate for the city as it existed before the war, growth in the last ten years has been so rapid that it has been

Digitized by Google

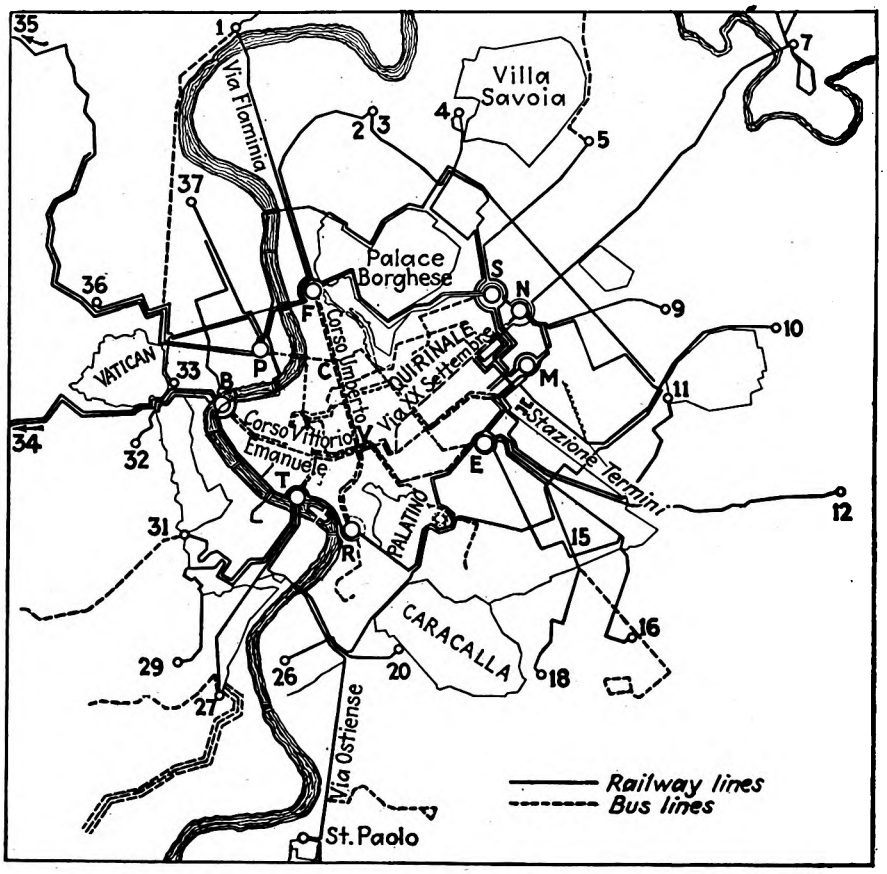
Routes

By

Eng. MARIO ASCARELLI

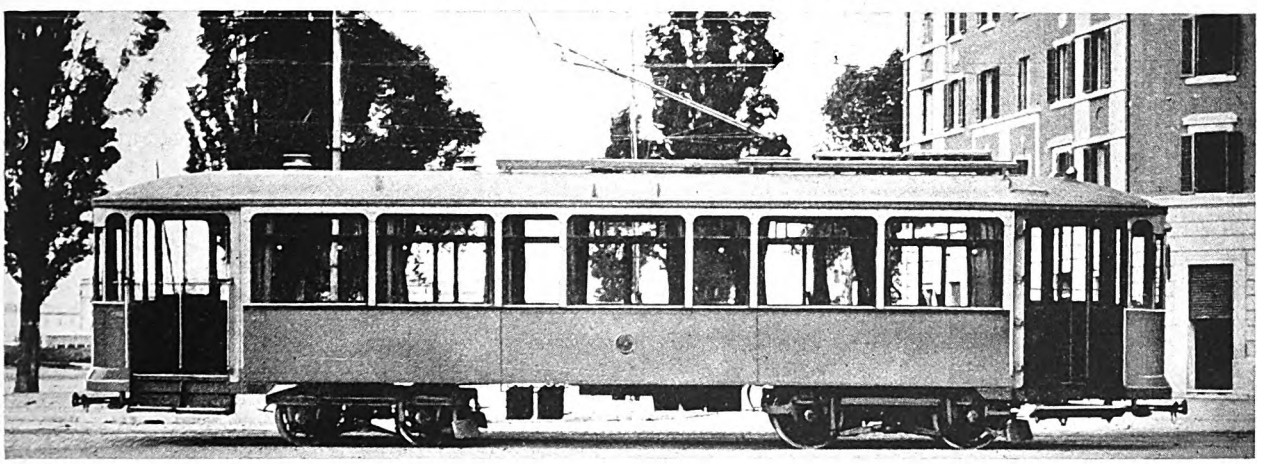
Manager of Track and Shops
Azienda Tranvie e Autobus del Governatorato
Rome, Italy

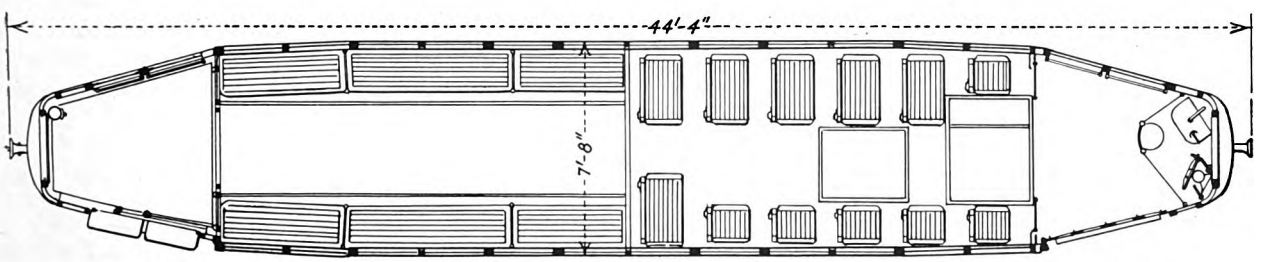
necessary to expand the transportation facilities greatly to keep pace with it. An accompanying table shows the increase in rolling stock and track of the surface lines between Jan. 1, 1920, and Dec. 31, 1929. Rome is one of the few large cities in Europe in which a considerable amount of construction has been undertaken since the war. The total amount spent was approximately 2,000,000,000 lire ($10,600,000). With the construction of 37 miles of track the surface lines have been extended proportionately more rapidly than the population has increased. This expansion program



When surface cars were taken out of business districts, better service was rendered on radial and belt lines

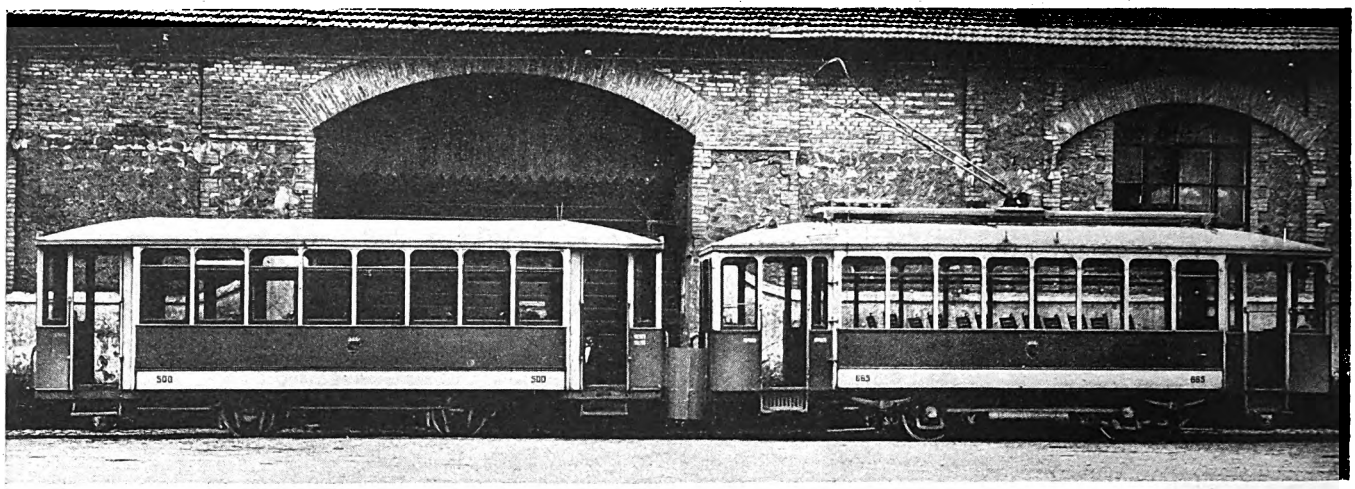
1—Piazza Ponte Milvio
2, 3—Acqua Acetosa
4—Villa Vellicelli
5—Piazza Verbano
7—Monte Sacro
9—Q. Itala
10—Portonaccio
11—Campo Verano
12—Acqua Bullicante
15—Santa Croce
16—G. Appio
18—Porta Latina
20—Santa Saba
23—San Paolo
26—Testaccio
27—Staz. Trastevere
29—Monte Verde
31—San Pancrazio
32—San Pietro
33—Vatican City
34—Porte Braschi
35—Santa Maria Pieta
36—Trionfale
37—Piazza Bansizza
B—Ponte Vittorio Emmanuele
C—Piazza Colonna
E—Santa Maria Maggiore
F—Piazza Flaminio
M—Piazza Indipendenza
N—Piazza Pia
P—Piazza Cavour
R—Piazza Bocca Verita
S—Piazza Fiume
T—Piazza Garibaldi
V—Ponte Venezia





New street cars of the MRF type have eighteen seats facing forward and twenty seats arranged longitudinally

Digitized by Google



Train service consists of one motor car and trailer, both of the one-truck type. Cars in these trains have all seats facing forward

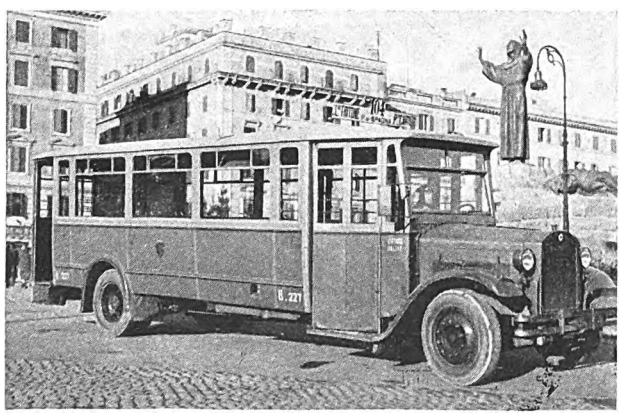
was carried out mainly to open up outlying districts where little or no transportation was available.

It was in the center of the city that the greatest difficulty was experienced. No additional street car traffic was possible, as the streets were too narrow to accommodate more vehicles than already were passing through. Rome, like other cities constructed during ancient and medieval times, has crooked, narrow streets, and circuitous routes have to be followed to reach the various districts. Despite the growing difficulties caused by traffic congestion, however, transportation facilities have increased about 10 per cent per year. The congestion finally became so serious that it was necessary to find some sort of relief to prevent a complete breakdown of the system.

As a means of meeting this situation, it was believed that much relief could be obtained if street cars were replaced by buses in the center of the city after the independent companies were taken over. This plan was first put in operation in 1927, when a few privately owned lines were acquired, but the resulting improvement was insufficient to solve the increasingly serious traffic problem. Certain street car lines had been eliminated or replaced by buses as an experiment, however, and the results indicated that this plan would bring some relief from congestion. Accordingly, between 1927 and 1929, plans were made for a replacement of all street cars by buses in the central business district of Rome. The entire transportation system has been laid out with the idea that ultimately passengers will be carried from outlying districts to the business centers by means of a subway in addition to other means of public transportation.

Table I—Growth of Rome Street Car System 1920-1929

	Jan. 1 1920	Dec. 31 1929
Miles of track	93	130
Number of track switches	400	831
Substation capacity, a.c. kw	4,400	10,100
Substation output, kw.-hr. per annum	20,000,000	60,000,000
Carhouse capacity, cars	550	1,000
Cars available	500	900



Electric buses are of the battery type and accommodate 18 seated passengers and 22 standees

Simplification of Routing Basis of New Plan

In making the traffic survey for the new routes, it was found that the principal difficulties of the old street car service could be summarized under three heads:

1. There were too many long lines with infrequent headways, irregular service, and indirect routes.
2. Many lines went through the congested district.
3. All cars covered the entire line and were heavily loaded in the center and almost empty at the ends.

Accordingly, in order to provide uniform means of traffic circulation in the central zone after it definitely had been decided to remove street cars from the congested

Table II—Comparison of Old and New Services in Rome

	Before Rerouting	After Rerouting
Miles of street with track	72.5	58.9
Miles of double track	130.2	104.8
Miles of street car route	217	...
Miles of bus route	67	...
Total miles of line	284	154
Number of street car routes	51	33
Number of bus routes	26	23
Number of car trains	486	400
Number of buses	91	200
Seats and standing room offered per hour per mile of route	125,000	123,100
Car-miles run per annum	24,200,000	.....
Bus-miles run per annum	2,800,000	.....
Total vehicle-miles per annum	27,000,000	26,040,000
Schedule speed of street cars, m.p.h.	6.63	7.44
Schedule speed of buses, m.p.h.	6.51	7.13
Energy used per annum by street cars, kw.-hr.	55,900,000	.....
Gasoline used per annum by buses, gallons	841,500	.....

Table III—Classification of Routes

	Before Rerouting	After Rerouting
Total number of tramway routes	51	33
Inner belt routes (two directions)	....	2
Radial lines	....	26
Outlying crosstown lines	....	3
Suburban lines	....	2
Total number of bus routes	26	23
Through routes in center	....	8
Lines entering center	....	3
Suburban lines	....	11
Radial line	....	1
Average length of route, street cars	4.3	2.5
Average length of route, buses	1.5	2.0

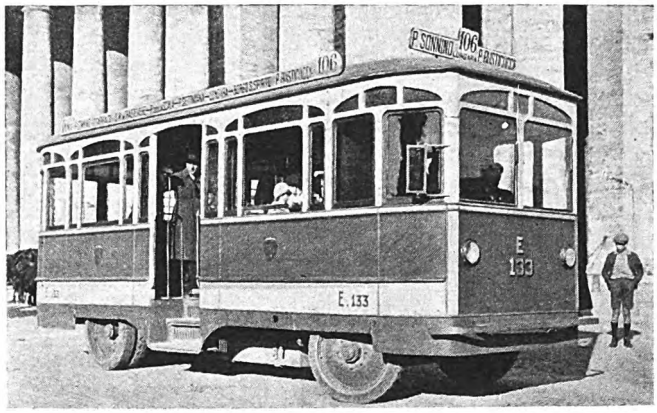
Digitized by Google

Table IV—Types of Street Cars of the Rome System

Type	MRS	CT-135	Trailer
Number	100	370	200
Class	Double truck	Single truck	Single truck
Number of windows	7	8	8
Two motors per car; horsepower of each	56	58	...
Brakes	Air	...	...
Over-all length	44 ft. 4 in.	...	...
Seating capacity	38	24	24
Standing room	47	21	25

Table V—Buses of the Rome System

Type	34-S.P.A. Short	34-S.P.A. Long	Lancia Omicron Long	Lancia Omicron Short	Electric Battery VAI
Number	70		160		40
Length	28 ft. 4 in.	30 ft. 10 in.	32 ft.	28 ft. 4 in.	21 ft. 4 in.
Width	7 ft. 6 in.	7 ft. 6 in.	7 ft. 9½ in.	7 ft. 9½ in.	7 ft. 6 in.
Seating capacity	16	24	26	18	18
Standing room	30	24	24	28	22
Weight, pound	13,860	14,960	15,620	13,640	14,740
Rating, horsepower	45	45	97	97	16



A Lancia bus of the Omicron long type affords seats to 26 passengers and room for 24 standees, and has a rear exit

business area a study was made to determine where the limits of the district could be established. Due to the topography of the city, which is hilly, and the various old monuments and buildings which can not be removed as being the last samples of a bygone civilization, traffic is slowed down considerably, and it was found impossible to give the exact limits of the district. Accordingly, a zone was laid out which includes practically all of the old Papal City excepting the Borghi and the Trastevere areas and also a part of the newer city. A double-track belt line encircles this district.

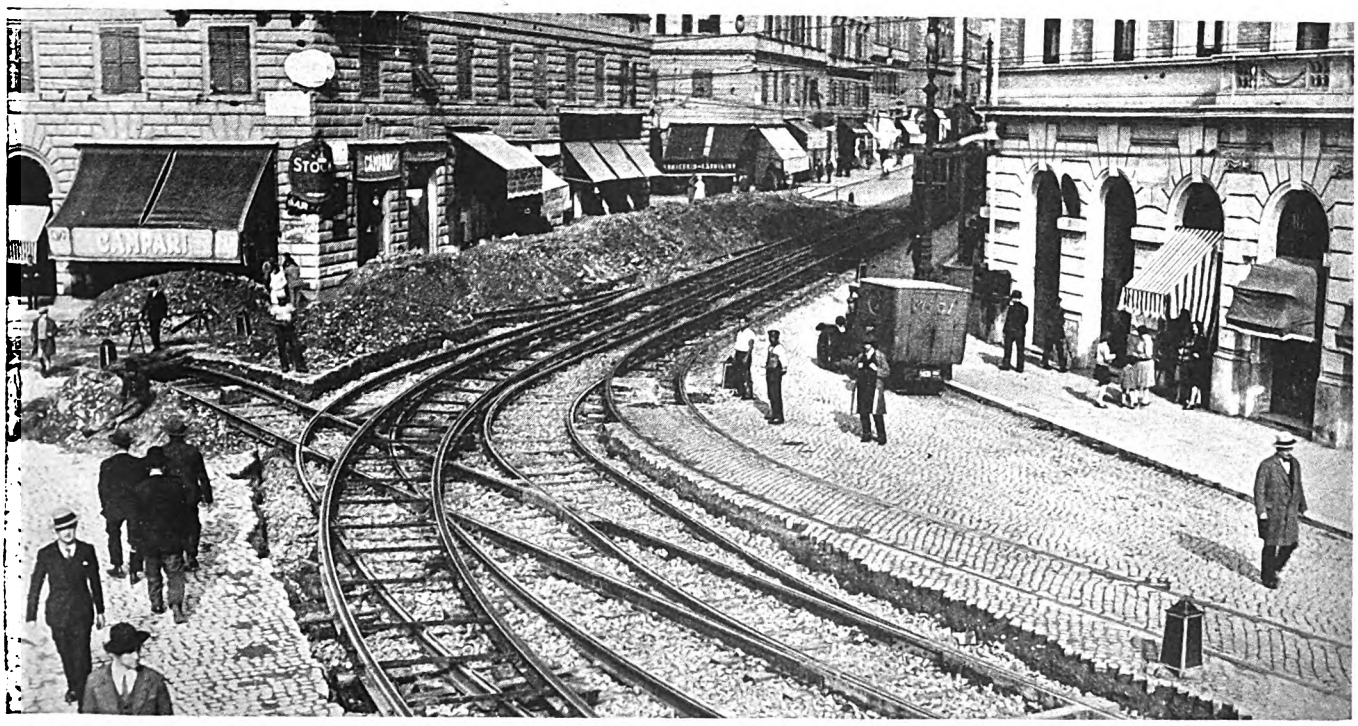
From the belt line the street railway routes radiate outward, having their outer terminals in the suburban districts. These lines enter the belt line at nine points where passengers can transfer directly to the latter or to the buses which run into the business district.

From these intersections the series of bus lines pass through the central points of Rome including the Piazza Colonna and Piazza Venezia.

In order to facilitate direct communication among outer portions of the city, it was planned to have a second or outer belt line, but since there appeared to be no need for carrying this line completely around Rome, only parts of the proposed route have been put in operation in the northwest, northeast and southeast sections. In addition to the surface lines which go out to the suburban districts, several bus lines serving these territories have been retained. They will be replaced by electric service, however, as soon as the traffic increases to such an extent that the change is desirable from the viewpoint of efficient transportation.

The fare system has been changed because the number of direct through lines was reduced and also to encourage passengers not going to the center of the city to take routes which do not enter the congested area. It was also desired to increase the riding habit of the public on the street cars because the latter have lower operating costs than buses.

Under the new arrangement the city can be considered as divided into three zones. First, the central zone in which service is given by buses only; second, the outer zone, which is served by street cars exclusively, and third, the suburban district which is served by street cars



While new trackwork was installed service was continued uninterrupted over old track

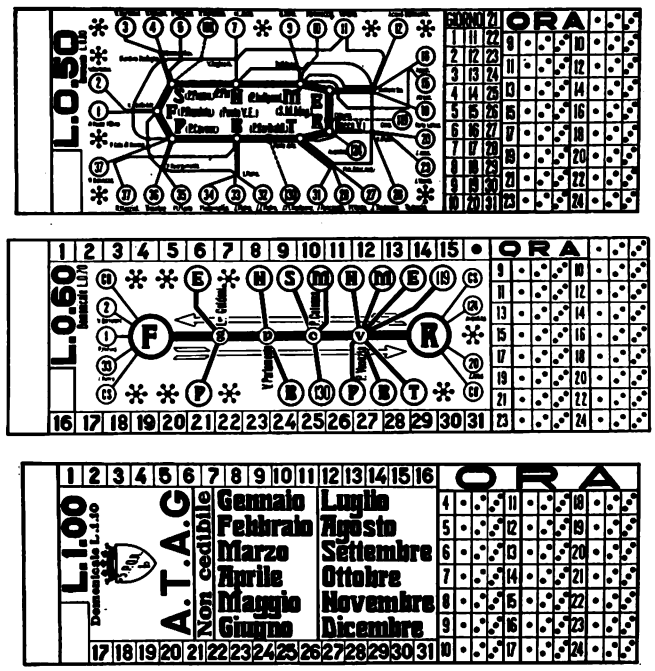
Digitized by Google

and independent bus lines. There are some exceptions to this arrangement, where bus lines are being run beyond the inner belt line and reach points in the intermediate zone. This was done because no track construction was possible in the districts thus served, which needed transportation facilities badly.

Transfer between street cars and buses is available to those passengers traveling from the center of the city to the outer districts and back. Separation of the routes improves service for both cars and buses, and reduces traffic delays in the center of the city. Another advantage is the flexibility of the routes, which can now be changed easily without disrupting the entire system.

The layout of the service is shown in an accompanying diagram. The belt line connects the nine principal transfer points indicated by letters. The bus lines are indicated by the initials of the two terminals they connect. The cars of each route carry the same number as the one given for the outer terminal.

In the new fare system, it was considered desirable to discourage the transit through the central business area of passengers who did not have to stop there. Although the fare system was wholly revised it was considered necessary to retain the existing minimum fare. New tickets were issued permitting transferring for a continuous trip from one point in the city to another, but the ride was limited to one direction only. The number of transfers permitted depends entirely on the routes of the lines involved. Two transfers are necessary when the entire trip is made by a street car and one transfer when the trip is made by buses or by a combination of bus and car. The time limit of the tickets has been set at one hour as it was considered that this was time enough to reach any transfer point during one continuous trip. In order to keep within this time limitation, three types of transfers have been provided. The first is priced at 50 centesimi (2.6 cents). This is the old rate and the ticket is good on street cars only. The second type of ticket is priced at 60 centesimi (3.2 cents) and is good on buses or a combination of car and bus. The third ticket, costing 1 lira (5.26 cents), is good for travel from one side of the city to the other. The car ticket shows the various routes and transfer points. The ring in the center represents the belt line surrounding the central business district. The bus ticket is similar except that it covers a specific route between two of the transfer points. These two tickets, with an extra fare for entering the business area, will keep practically all the passengers in the outer district who do not have to transact business in the restricted zone. The 1-lira ticket is good on all cars or buses for the date and hour punched, and has been in use for several years. Corresponding to each of the three types of tickets there is a season ticket, which eliminates paying a fare each time bus or car is boarded.



Three different types of transfers are issued for the unified service

A comparison of the old and new services is given in an accompanying table. It will be noted that there has been a material reduction in the number of miles of street in which car tracks are used. While the old rails have not been torn up so far they have not been used since the beginning of the year. There has been a reduction of 25.4 miles of double track. Due to the elimination of duplication of routing, the total miles of car routes and bus lines has been reduced from 284 to 154, a saving of 130 miles of route. The principal saving is in the reduction of the number of car lines from 51 to 33, although the bus routes have been decreased from 26 to 23 only at the same time. The number of car trains has been greatly reduced, while the number of buses in service now is more than double. The total number of vehicle-miles per annum, however, has been decreased slightly, while it will be noted that the scheduled speed both for cars and buses has been increased a little over 10 per cent. The number of car and bus routes and the number of lines serving the various territories are given in an accompanying table. A list of the various types of rolling stock operated by the transportation system is given in tables 4 and 5, which list the cars and buses separately. In addition a few cars and trailers of an old type are being retired.

About two months of construction work was necessary and a new electric substation was installed. This new substation transforms 8,000 volts a.c. to 600 volts d.c. through mercury vapor converters with a rating of 350 kw. built by the Societa Officine Subalpine of Turin. Cables for the distribution system have been installed to an aggregate length of 6.2 miles. It also is expected that a new substation with a rating of 2,000 kw. will soon have to be installed in the Piazza San Pietro.

The most important track construction was the installation of special work at the newly created transfer points, while some sections of nearby lines were connected in order to complete the inner belt line. Apart from these changes comparatively little new track work had to be laid. The change-over of the old system to the new was effected in four hours on New Year's Day, from 1 to 5 a.m. The new installation comprised 12.2 miles of track, 106 switches and 362 frogs.

In order to familiarize the public with the new routing, signs were placed at all transfer points and at various locations along the line, where sections of maps and tables were also available.

EDITOR'S NOTE—Since the new system was put in operation Jan. 1 of this year, there has not been sufficient time to determine whether the results are satisfactory. Conflicting reports have been received at this office. Definite information is awaited with interest.

Digitized by Google

Electric Coaches Installed on New Orleans Shuttle Line

By

W. S. Rainville, Jr.

Equipment Engineer New Orleans Public Service, Inc.
New Orleans, La.

Equipped with two 50-hp. motors each, the New Orleans electric coaches are capable of attaining a maximum speed of approximately 25 m.p.h. and maintaining a schedule speed of more than 10 m.p.h. This view shows the Twin Coach on Carrollton Avenue.

Two vehicles being operated on short feeder route through residential and business districts. Company seeking experience to determine possibilities of this type of vehicle on other light traffic routes

CONFRONTED recently with the necessity for rebuilding track on a short, unprofitable street car line, the New Orleans Public Service, Inc., decided to substitute trackless trolleys. The management felt that the substitution would not only put the line on a paying basis, but would also afford an opportunity of becoming familiar with this type of vehicle and studying its possibilities for use on other railway lines with light patronage.

Two electric coaches were purchased, one from the Twin Coach Corporation and the other from the American Car & Foundry Motors Company. On Dec. 2, 1929, the two 28-passenger, single-truck cars were withdrawn and the new vehicles placed in service. The route, which is 1.214 miles in length, parallels the Carrollton Avenue street car line in the western part of the city for two blocks, extends northwest on Oak Street to a district called Southport, goes two blocks northeast on Eagle Street and then back to Carrollton Avenue by way of Willow Street. With the exception of two short blocks the entire route is over paved streets. On Willow Street, where the street car tracks were eliminated, new paving was laid in 1929.

The cash fare of 7 cents charged on the electric coach line is the same as on the company's car lines. Transfers are accepted from other car lines and are issued free. A headway of eight minutes is maintained on the route by one coach, the other coach serving as a standby.

Digitized by Google

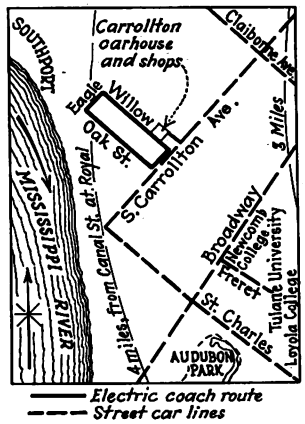
The total daily mileage of the operation is approximately 175 miles, the coaches being alternated in morning and afternoon service. Although this operation is a small one, it is sufficient to familiarize the distribution, transportation and rolling stock and shop departments with electric coach operation.

Overhead construction for the route is of the simplest type, the same materials being used as in the street railway overhead system on tangent and curve construction. Both positive and negative trolley wires are of No. 00 copper, spaced 24 in. apart. Positive feeder taps are essentially the same as those used for the previous street car operation. The negative trolley wire is grounded to existing rails on near-by streets at several points. There are no spring frogs, special insulated crossings, wyes or loops in the installation.

Electric Coaches Are of Latest Design

The electric coach supplied by the American Car & Foundry Motors Company is constructed entirely of steel along the lines of the A.C.F. "Metropolitan" bus. It weighs 19,000 lb. and is mounted on 38x9-in. tires, with duals on the rear. An entrance door is located behind the front wheels, and a treadle-operated exit door is at the rear. National Pneumatic electro-pneumatic door control, with full brake interlock safety features, is provided. The coach has a nominal seating capacity of 40 passengers, but this was cut to 38 by removing two seats from over the forward wheel housing at the right.

This vehicle is powered with two General Electric 298, 50-hp., automotive type railway motors. They are supported rigidly from the body framing and are connected to a Timken inverted worm-drive axle by two single section 3½-in. tubular drive shafts provided with two all-metal joints per shaft. A gear reduction of 11 to 1 is used. The motors are controlled by the General Electric type PCM foot-operated automatic control, without dynamic braking. The main motor controller is located in a compartment beneath the rear cross-seat. This unit can be reached for inspection by removing the rear seat or an exterior panel in the rear of the coach. The controller includes three contactors for making the series and parallel connections of the motors, two line breakers for the positive and negative trolley leads, an overload relay, an accelerating relay and two motor cut-out switches. The resistor portion of the controller is operated by a camshaft driven by an air engine. Nine series and nine parallel steps are provided, so that the current changes on each step are small.



Relation of the new electric coach line in New Orleans to the Carrollton Avenue and other near-by street car lines. Although only 1.214 miles in length, the route goes through a business district and a well-built-up residential section

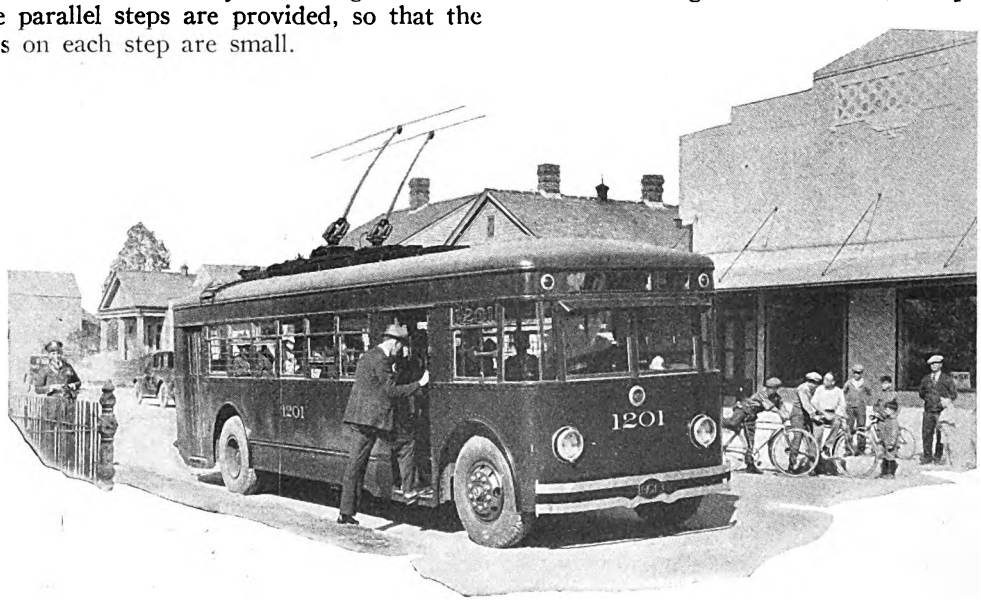
Operation of the main controller is by a master controller mounted in the floor of the coach at the operator's position. The pedal on this controller has four operating positions—off, switching or holding, full series running and full parallel running. Movement of the pedal is about 3 in. and only a very slight pressure is required.

The motor reverser, which is mounted horizontally at the driver's left, is of the hand-operated drum type, with three positions—forward, off and reverse. This device is so arranged that the control circuit is complete only when the handle is in one of its operating positions. Motor resistors are of the edgewise-wound ribbon type. Current collection equipment includes 4-in. Kalamazoo wheels, the Ohio Brass Company's swivel harp, 18-ft. 6-in. poles, the O.B. Form 5 trolley base and O.B. trolley retrievers.

Brakes on the A.C.F. electric coach are of the four-wheel air-operated type. The CP-25, 10-cu.ft. air compressor, MJ compressor governor and VB-2 foot-operated brake valve are of General Electric manufacture. The air brakes are supplemented by a mechanical hand brake, consisting of a 16-in. disk brake mounted on each propeller shaft. This is controlled by a lever to the right of the operator.

The electric coach manufactured by the Twin Coach Corporation is constructed of Plymetl and steel, weighing 16,500 lb. completely equipped. It is mounted on single 40x10½-in. medium pressure tires in the front and 38x7-in. high pressure duals on the rear. The entrance door on this coach is located ahead of the front wheels. The circulating load feature is provided by a treadle-operated exit door in the rear. This coach has a seating capacity of 42 passengers and is equipped with bellows type seats, upholstered in rattan.

Two Westinghouse No. 1426, 50-hp automotive type



The trolley poles of the coaches are 18 ft. 6 in. in length, permitting a wide range of travel on the streets. In this view the A.C.F. coach has swerved far from the line of the overhead to receive passengers at the curb

Digitized by Google

railway motors are used. These are connected to the special Timken-Twin Coach underslung dual worm axle by two 2-in. diameter shafts with Cleveland Universal joints at each end. The motors are controlled by Westinghouse type VA foot-operated automatic control, without dynamic braking. All main control apparatus is located under the rear seat, accessible from both the interior and exterior of the coach.

The motor control equipment is operated by a master controller mounted beneath the floor and connected to a pedal at the operator's position. The motion of the controller drum operates the main circuit switches directly and also changes the setting of the limit relay. In this manner the rate of acceleration is governed by the distance to which the accelerator pedal is depressed.

To the left of the operator is mounted the motor reverser, of the hand-operated type and with four positions—off, forward, reverse and emergency braking. The main resistors are of the edgewise-wound Type M, and are mounted beneath the floor. Current collection equipment is the same as that for the other coach.

Brakes for the Twin Coach are of the four-wheel air-operated type, using ABS Brakebloks and gun iron drums. The DH-10 air compressor, R-414 compressor governor and B-4 brake valve were furnished by the Westinghouse Traction Brake Company. The air brakes are supplemented by an emergency brake consisting of two drum-type driveshaft brakes actuated by a hand lever.

Both vehicles are housed in the Carrollton Station and are inspected and maintained by the regular carhouse crew. Because of the simplicity of the electric coach no skilled mechanics are required. It is the intention of the company, however, to place pitmen in the bus garage for short periods so that they may become familiar with the rear axle, steering mechanism and other distinctly automotive parts. Inspection and greasing have been placed on a 2,000-mile basis. One of the street car inspection pits has been adapted to the use of the electric coach by installing guard rails along its sides. A negative wire is suspended in the carhouse, parallel to the street car positive wire, for bringing coaches over the pit. A portable outfit for inflating the tires was constructed a DH-16 railway air compressor and two air reservoirs being used. With the exception of a Manley Hi-lift jack, no special equipment has been purchased for the maintenance of the new vehicles.

Road Builders Recommend Relief of Paving Obligations

VARIOUS recommendations directly affecting electric railways were embodied in the report of the sub-commitee on street railway tracks and paving of the American Road Builders Association presented at Atlantic City, Jan. 13-18. The conclusions in the report were based on a survey covering some 4,000 miles of track. Particularly significant is the recommendation that the cost of paving in the track area should not be borne by the railway alone.

Girder rails varying in height from 6 in. to 9 in. are used in 80 per cent of the cities, according to the report. The 7-in. girder rail is the most popular. Girder rails have many advantages over the T-rails from the paving engineers' standpoint. The low joints which were so common in old track construction, with their resulting breaking of the pavement, seem to be overcome through the general use of a combination bolted and welded joint.

The use of wood ties predominates, according to the committee. A few cities use both wood and steel ties, and some use only steel ties. The majority of the users of wood ties use broken stone or slag ballast from 6 in. to 8 in. thick, while the users of the steel tie use 8 to 12 in. of concrete, or from 6 to 8 in. of broken slag or stone for ballast under the ties. Concrete is quite generally placed between and over the ties to support the paving surface or for the surface itself. Brick, stone blocks and concrete are used in about equal amounts for the paving within the track area. Some asphalt paving is used, especially along the outside of the rails. The roadway pavement wearing surface is carried to the outside rail in about 60 per cent of the surveyed cities.

The survey disclosed the fact that in 70 per cent of the cities, the city engineer determines the type of track construction, and in 75 per cent of the cities he supervises the track and paving construction, although 80 per cent of the railway companies pay for the paving in the track area. In only two instances does the city maintain, at its own expense, the pavement in the track area, and in only two other instances does it do the maintenance at the expense of the railway company.

After pointing out the heavy expense involved in construction of a suitable pavement, the committee suggests that the public, as represented by the taxpayer or the users of motor vehicles, should contribute toward the paving of that portion of the roadway within the track area. Under this arrangement, it is intimated that a more substantial type of track construction might be provided, which would be of advantage to both the users of the railway cars and bus and automobile riders.

In the construction of street railway tracks, in city streets, the committee believes the most permanent type possible to be obtained should be adopted. The sub-base for track construction should be thoroughly drained and unyielding. Special effort should be made to produce such a result, and, if necessary, a sub-base of concrete should be provided, in order to secure a firm base. In cities where an 8-in. concrete slab has been used as a sub-base, the results have demonstrated its superiority over other types. Experience seems to indicate that, from the standpoint of paving surface, the best results can be obtained by the use of grooved rails, although some cities seem to be getting fairly good results with T-rails. With grooved rails it is much easier to secure and maintain a satisfactory paving surface, since the pavement can be finished flush with the steel. With such construction the cross movement of traffic is greatly facilitated.

It is felt that the use of brick and stone block paving in the car tracks gives more satisfactory results than other types. The block type, with asphalt filler, is easily removed when repairs to the rails are necessary, and absorbs more readily the vibration set up by car traffic.

Whatever the design of the track construction and its paving, it seems logical to make a complete separation between the roadway pavement and the track structure. Each should be capable of supporting the maximum traffic loads independent of the other.

Digitized by Google

Comfortable travel through sections of scenic beauty is provided by many intercity bus routes

De Luxe Bus

Finds Wide Application

WITHIN the past five years, no phase of surface transportation has expanded more rapidly than has that of intercity bus operation. At the beginning of 1930, a total of approximately 29,500 buses, most of which are of the de luxe type, were regularly rendering such service over 300,000 miles of route. Nearly 33,000 miles of intercity lines, both intrastate and interstate, were added in 1929. The electric railways of the country have been among leaders in this development. They have extended their fields of operation with new intercity lines, in many instances through territories already served by interurban cars, have absorbed competing independent bus companies and co-ordinated the selective services, and have stabilized intercity operation in a number of instances by the abandonment of long unprofitable interurban car lines and the substitution of more direct, fast and comfortable bus routes.

Important factors contributing to the progress in intercity bus transportation are the luxurious features of the buses themselves, the growth of convenient terminals, the extension of improved highways, the co-ordination of interline services and the extensive merchandising of nation-wide travel by bus. The great majority of buses now being used on long distance routes are comparable in comfort and convenience to the private automobile, with adequate facilities for handling small baggage. They travel on the newest and most direct highways between two cities, beginning and ending the trip at comfortable, centrally located terminals where connections with other lines are made with minimum delay.

Co-ordination of interline services and the joint use of terminals by two or more companies, serving different territories, are the two factors which are doing most to stabilize intercity bus operation. Facilities on a network of routes covering the whole country are gradually assuming the form of one large unified system. Not only is this true of the routes themselves, but it is true from operating, economic and maintenance standpoints. Interline agreements and service arrangements between the Pennsylvania-Ohio System and the number of through bus lines operating in the state of Ohio form a notable example of this co-ordination. Practically every bus line from the West or Middle West, traveling to the Eastern states, passes through the state of Ohio and into the town of Youngstown. In Youngstown a central terminal is maintained and operated by the Pennsylvania-Ohio System to which all these through lines report for the interchange of passengers. Mechanics and service equipment are located at this terminal for the use of any line.

Digitized by Google

Unification of intercity systems and construction of improved highways have been major factors in the steady expansion of long-distance bus operations. Increasing popularity of this type of service promises continued growth

in Interurban Service

By

J. R. Stauffer

Assistant Editor
Electric Railway Journal

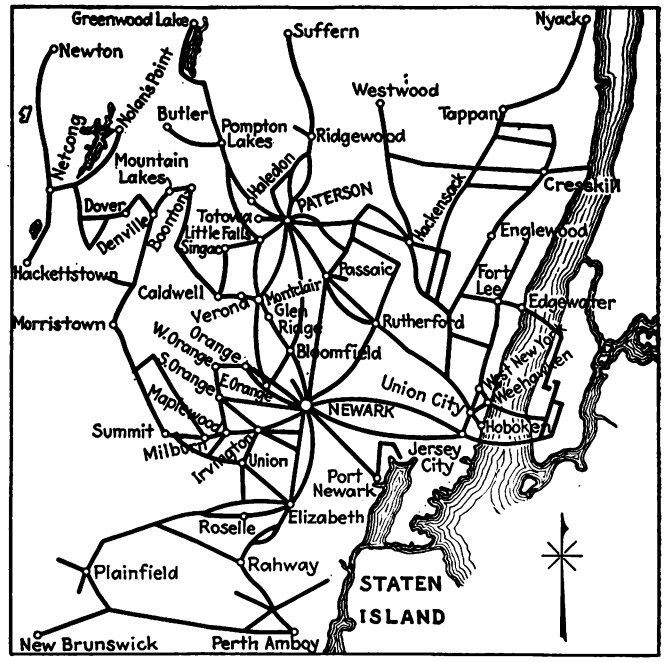
Efforts to secure as many direct interline connections and as many interline joint tariffs as possible with other lines in this district have resulted in suitable arrangements with practically every operation which would be of value to the system in the state. A rather unusual agreement for the sanding of hills during icy weather has been made. The through lines purchase the sand or ashes, the Pennsylvania-Ohio System transports it to important points along the routes and the highway department of the state does the actual spreading.

A comparative study of intercity de luxe bus operations as carried on by three companies will be found in an accompanying table, showing details of fare structures, territories served and equipment used.

Public Service Co-ordinated Transport, operating throughout the entire state of New Jersey, is the largest bus operating organization in the United States. In a consideration of intercity bus operation a great majority of the local lines could properly be put under that classification, as their services join more than 300 municipalities in the state. Two accompanying maps show interstate and intercity bus routes in north and south New Jersey. The operations extend into New York from northern New Jersey and into Philadelphia from southern New Jersey.

Interstate service is operated to New York City from Nyack, New York, Elizabeth, Montclair, the Oranges, Maplewood, Paterson and Passaic, all in New Jersey. From Philadelphia, Pa., lines operate to New Jersey to Vineland, Millville, Bridgeton, Pennsgrove and Billingsport. A number of de luxe intercity bus operations are carried on wholly within the state operating from the cities of Newark, Paterson, Camden and New Brunswick.

The Cincinnati Street Railway has operated for the past two years a de luxe motor coach line during the morning and evening rush hours between Government Square and Avondale, a one-way distance of 4.6 miles. One bus was used in this service, making two trips inbound in the morning and three trips outbound in the evening. In the morning no one patronized the line outbound and in the evening only one or two used it inbound. At first the public was slow to use this service, but patronage grew until there was sufficient demand for this high-class service all day, so four new buses were purchased. These coaches, designed for 29 passengers, were equipped to seat only 25, giving 36 in. between seats. This made it possible for a person sitting next to the window to leave without disturbing the person on the aisle. Provision for two card tables was made at the rear, where the last two seats over the wheel casing face backwards.



Public Service operates an extensive intercity service in northern New Jersey

The route was extended a mile further to Avondale Heights, a new and highly restricted subdivision, and an all-day schedule was put into effect on Nov. 25, 1929. The new schedule called for a half-hour headway between 7:30 a.m. and 8:30 p.m. and hourly service from 8:30 p.m. to midnight. The fare on this line was established at 25 cents, with five tickets for a dollar, no transfers and no standing passengers.

During the latter part of December, patronage grew during the rush hour until certain trips had to be double-headed. This continued after the holidays, so on Jan. 13, 1929, a new schedule, giving fifteen-minute service during the evening and morning rush hours between Government Square and old Avondale, and 30-minute service to the Heights, was placed in effect. Service outbound after 6:30 p.m. and inbound after 7 p.m. was discontinued, as experience had shown it was not patronized. The line competes with an independent bus operation at a 10-cent fare and a street car line over about 60 per cent of the route, and with a 10-cent bus line belonging to the Cincinnati Railway over about 85 per cent of the route. Despite all this the receipts are gradually increasing and it is estimated that the line will be on a paying basis within a period of twelve months.

The Twin City Rapid Transit Company, Minneapolis, Minn., furnishes without competition all the local bus transportation in Minneapolis, St. Paul and suburban territory. De luxe bus service is operated on eight lines of which the total route mileage is approximately

Digitized by Google

97 miles. Three of these lines, with a total of 52 miles, operate into suburban districts. All serve territories having street car lines, thus giving the district preferential service but over different routes.

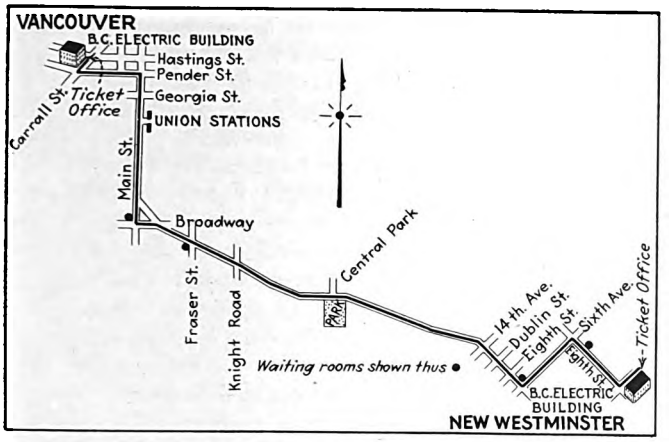
The fare on two of the three intercity de luxe bus lines, operating between the loops of Minneapolis and St. Paul, a distance of about 10 miles, is 25 cents for the entire distance, or any portion thereof. On the third intercity line tokens are sold at the rate of two for 25 cents, one token being accepted as fare within the limits of either Minneapolis or St. Paul, the intercity ride requiring two tokens. A passenger making the Minneapolis-St. Paul trip by street car is required to pay a fare in each city, the present fare being 10 cents cash, or a token sold at the rate of six for 45 cents.

The speed on the intercity buses between the loops

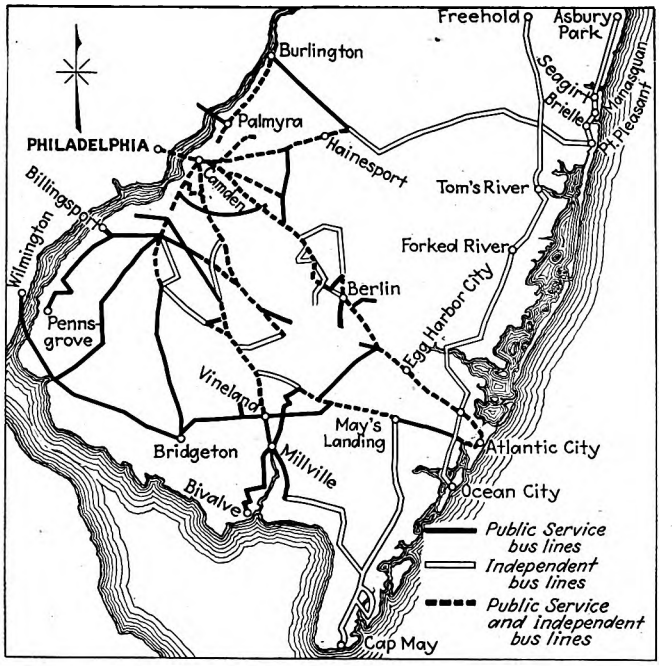
Comparative Study of Twenty-Six Intercity De Luxe Bus Routes

Company	Line	Mileage One Way	Equipment Used	Cities or Towns on Route	Other Transportation on Route	Through Fare	Fare on Competing Lines	Headways	Speed M.p.h.	Speed of Competing Lines M.p.h.	Stan-dees
The Connecticut Co. New Haven, Conn.	New Haven to Bridgeport	18	Type Y Yellow Coaches	West Haven Milford Stratford	Interurban car circuitous route	60c.	5 tokens @8⅓c. cash 50c.	1 hour	17.68	13.22	Yes
	Bridgeport to East Derby	14.5	Type Z Yellow Coaches	Stratford Shelton Derby	Bus service replaced interurban car	4 tokens @8⅓c. cash 40c.		1 hour	19.49		Yes
	Meriden to Middletown	9	Type Z Yellow Coaches		Bus service replaced interurban car	30c.		1 hour	22.44		Yes
	Meriden to Wallingford	7	Macks	Yalesville	Bus service replaced interurban car	3 tokens @8⅓c. cash 30c.		30 min.	14.74		Yes
	Meriden to New Britain via Berlin	11	Whites	Berlin	Interurban car via Plainfield & Southampton	4 tokens @8⅓c. cash 40c.	4 tokens @8⅓c. cash 40c.	40 min.	16.78	16.09	Yes
	Hartford to New Britain	11.5	Yellow Coaches	West Hartford	Interurban car	3 tokens @8⅓c. cash 30c.	2 tokens @8⅓c. cash 20c.	1 hour	13.92	14.56	Yes
	Norwich to Putnam	35	Yellow Coaches		Bus service replaced interurban car	11 tokens @8⅓c. cash 1.10		1 hour	19.67		Yes
Pennsylvania-Ohio Public Service Corp. Pennsylvania-Ohio Coach Lines Youngstown, O.	Youngstown to Cleveland	70	6 cyl. Whites 35 passenger	Girard, O. Niles, O. Warren, O. Chagrin Falls, O.	Erie R.R. Penna R.R.	$2.00	Erie $2.39 Penna $2.39	2 hours	24.0	42.0	No
	Youngstown to Akron	50	Fageols 33 passenger	No incorporated communities	Erie R.R. B. & O. R.R.	$1.60	Erie $1.92 B. & O. $1.92	2 hours	26.0	40.0	No
	Newcastle, Pa. to Cleveland via Youngstown	90	6 cyl. Whites 35 passenger	Youngstown, O. Girard, O. Niles, O. Warren, O. Chagrin Falls, O.	Interurban car Youngstown to Newcastle	$2.50	Youngstown Newcastle 45c. Bus 75c.	4 hours	24.0	40.0	No
	Youngstown to Greenville, Pa.	30	Fageols 26 passenger	Hubbard, O. Sharon, Pa.	Erie R.R.	$1.00	$1.10	3 hours	24.0	30.0	No
	Youngstown to Warren	15	4 cyl. Whites 25 passenger	Girard, O. Niles, O.	Interurban car Erie R.R.	50c.	Cash 40c. Tickets 30c. R.R. .51	1 hour	20.0	13.0 30.0	No
	Sharon to Newcastle, Pa.	24	Fageols 26 passenger	Farrell, Pa. W. Middlesex, Pa. New Wilmington	Penna R.R.	$1.00	.72	2 hours	24.0	36.0	No
	Youngstown to Sharon	15	Fageols 26 passenger	Hubbard, O.	Interurban car Erie R.R.	50c.	40c. .51	1 hour	25.0	35.0	No
Northern Ohio Power & Light Co. Cleveland-Akron-Canton Bus Co. Akron, Ohio	4 Routes from Akron to Cleveland via (a) State Road (b) Hudson Road (c) Brecksville Road (d) Broadview Road	38.9 41.6 37.85 35.45	Twin Coaches Whites Yellow Coaches	Northfield Hudson Brecksville W. Richfield	Interurban cars and railroad	$1.40	Interurban car $1.00 Railroad $1.34	30 min. to 1 hour alternating between 4 routes			Yes
	Akron to Canton	24.40	Twin Coaches	Uniontown Greentown N. Canton	None	70c.	No comp.	30 min. to 1 hour			Yes
	Canton to Wooster	33.90	Whites	Massilon Dalton East Union	None	$1.00	No comp.	Every 2 hours			Yes
	Canton to Dennison	40.10	Yellow Coaches	N. Industry Dover New Philadelphia	None	$1.50	No comp.	Every 2 hours			Yes
	Massillon to Dennison	37.9	Yellow Coaches	Justus Dover New Philadelphia	None	$1.35	No comp.	Every 2 hours			Yes
	Akron to Wadsworth	17.1	Whites	Copley Loyal Oak	Interurban car	35c.	35c.	5 trips daily			Yes
	Akron to Edinburg	26.5	Various types	Stow Kent Ravenna	Interurban car	75c.	Comp. only to Ravenna	2 trips daily			Yes
	Dover to New Philadelphia	3.0	Various types	Dover New Philadelphia	None	15c.	No comp.	Every 15 min.			Yes
	Barberton to Wadsworth	7.36	Various types	Norton Center	Interurban car	15c.	14c.	City schedule			Yes

Digitized by Google



British Columbia Rapid Transit Company has co-ordinated a de luxe bus line with an existing car line



Bus operations by Public Service have steadily expanded in southern New Jersey

of Minneapolis and St. Paul ranges from 13 to 14 m.p.h. On the three suburban de luxe lines the speed ranges from 14 to 18 m.p.h. These speeds compare with 9 m.p.h. on city and feeder service, and 10 m.p.h. on street cars.

The British Columbia Rapid Transit Company, Vancouver, B. C., a subsidiary of the British Columbia Electric Railway, operates two services, de luxe motor coach and express. The lines are confined to districts in which the railway operates and terminate at the same depots, thus co-ordinating and getting the maximum use from railway and coach equipment at peak hours.

Between Vancouver and New Westminster, the railway operates over three routes, the de luxe motor coaches paralleling one of these. A one-way fare of 25 cents is charged on the coaches, and a round-trip fare of 35 cents on the rail cars. There is about five minutes difference in the running time. The interurban cars operate a twenty-minute service, and the motor coach schedule calls for a fifteen-minute headway throughout most of the day. A second de luxe bus operation parallels an interurban railway line into the Fraser Valley for a distance of about 72 miles. The motor coach fares on this route are based on the rate of 4 cents per mile, whereas the railway fares are based on 3 cents per mile, excepting at points where there is competition, when the competitive rate is met.

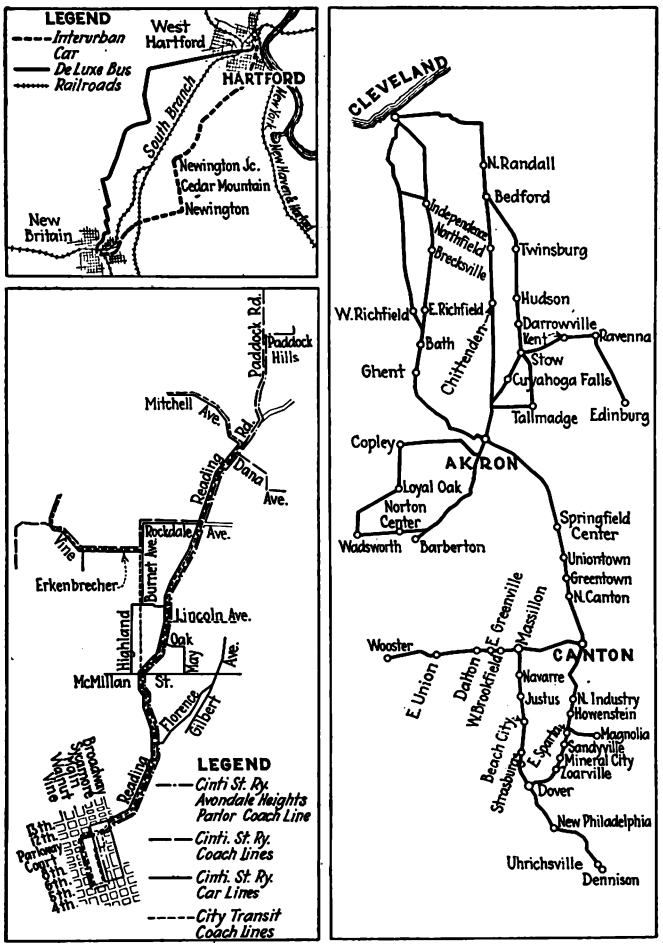
Eleven Fageols, two Whites, and one Federal sedan type bus, all fully equipped for de luxe service, are used on these lines. The motor coach service has proved satisfactory, and, from a financial standpoint, though the coaches take away some revenue from the railway, as a whole the earnings have increased. This is due to the fact that the motor coaches have eliminated strong competition by jitneys which gave a door-to-door service.

Intercity bus service carried on by the Connecticut Company in the state of Connecticut consists of seven lines. In the case of three of these lines, namely, Bridgeport-New Haven, Hartford-New Britain and Meriden-New Britain, the terminals are also connected by interurban car lines. The lines between Meriden and Wallingford, Norwich and Putnam, Meriden and Middletown, and Bridgeport and East Derby replaced trolley operations. In most instances where interurban cars and buses are operated, the cars cover a different or more circuitous route than the buses.

Between Bridgeport and New Haven a comparison of the two services is as follows: On the interurban cars the fare is 50 cents cash or five tokens at $8\frac{1}{3}$ cents apiece; the running time is one hour and 45 minutes and a headway of 30 minutes is maintained. On the bus, the through fare is 60 cents cash and no local business is done in the city where street cars are paralleled, excepting between Stratford and Bridgeport, where the minimum fare is 20 cents as compared with $8\frac{1}{3}$ cents

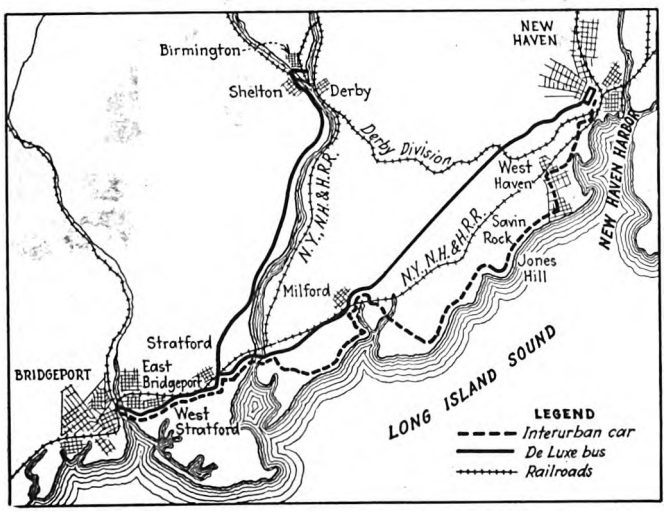
Union bus terminal is located in heart of Youngstown and serves all through lines

Digitized by Google



Upper left—Connecticut Company has car and bus services between Hartford and New Britain. Lower left—Superior type bus service is being operated by Cincinnati Street Railway to Avondale Heights. Right—Northern Ohio Power & Light Company operates de luxe buses over 383 miles of route

on the cars. The running time is 58 minutes and the headway is hourly. Between Meriden and New Britain, by way of Plainville and Southington, the interurban car runs on a headway of 30 minutes and consumes one hour and 17 minutes to make the trip, while the bus operates on a 40-minute headway with a running time of 38 minutes. The fare on these lines is the same, four tokens at 8⅓ cents each or four cash fares at 10 cents each. On the Hartford-New Britain line, the interurban car operates on a 30-minute headway during the non-rush hour and on a 20-minute headway during the rush hour, the fare being two tokens at 8⅓ cents each or 20 cents cash, while on the bus, the fare is 25 cents using tokens or 30 cents cash. The running time is 55 minutes and the headway is hourly.



De luxe buses use more direct route than interurban cars between New Haven and Bridgeport, Conn.

The Pennsylvania-Ohio Public Service Corporation and its subsidiary, the Pennsylvania-Ohio Coach Lines, began de luxe intercity bus service on Aug. 1, 1922, between Youngstown and Warren, Ohio. This original installation of bus service was made to eliminate a hack competition which was drawing patrons from the interurban car service between the two cities. On Nov. 1, 1922, a second line was inaugurated between Youngstown and Sharon, Pa. The hack competition continued to grow and additional bus lines were put in throughout the territory but by the latter part of 1923 the competition was eliminated and it was only necessary for the company to purchase two out of ten lines.

At the present time the Pennsylvania-Ohio Coach Lines operates over seven routes and operates bus terminals in Cleveland, Youngstown and Warren, Ohio. Two lines, namely, between Youngstown and Warren, and Youngstown and Sharon, Pa., are in direct competition with interurban car service. For the other lines competition consists of railroad service. On the New Castle, Pa., to Cleveland, Ohio, route, which operates by way of Youngstown, interurban car service is run between Youngstown and New Castle.

Co-ordination between the lines operated by the Pennsylvania-Ohio System and all connecting long distance lines operating through the state has been one of the chief factors in the success of the operation carried on by this company. After extensive preliminary work they have been successful in adjusting the schedules of their lines and connecting lines so that proper connections can be made at various points throughout the state. Likewise they have co-ordinated the sale of tickets or commutation mileage for use on other lines as well as their own. Commutation mileage books having a travel value of $10 and which are sold for $7.50 are handled by the Great Lakes Stages, Southwestern Bus Company and the Penn-Ohio Coach Lines, and are honored on practically all lines in the community. The mileage is redeemed by the company at the reduced value. Through-ticket sales for long hauls have been comparatively easy, but it has taken a great amount of effort to secure the many interline connections and joint tariffs with short routes which are now in existence. The results are indicated by the fact that one interline connection alone, involving a stub end of 15 miles, owned by an independent operator, gives and accepts from the Penn-Ohio lines as many as 1,400 passengers per month, all of whom are interline passengers. Another service rendered by this company is its direct connection between points on its line and the boats of the Detroit & Cleveland Navigation Company. Certain buses are run right to the docks of the company and through tickets will be sold for through travel by bus and boat in the near future.

Extensive merchandising of the various services by intercity buses is carried on by the company. Schedules are mailed by a group of bus operators to about 3,000 residents of the state. In addition to this approximately 1,200 schedules are mailed by the company to a group of people who previously received them and answered a letter asking about the effect of mailing such timetables and information. These 1,200 people requested

Digitized by Google

that the schedules continue to arrive at their homes. Every hotel in the state and most of the department stores receive schedules in bulk which are placed at convenient points for the use of their patrons.

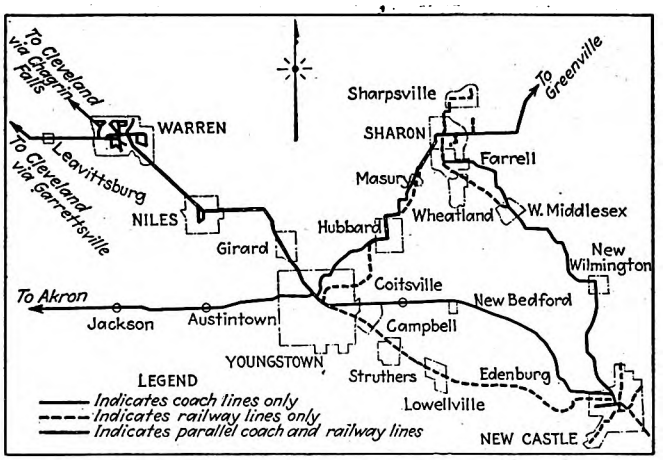
De luxe bus operation carried on by the Pacific Electric Railway, Los Angeles, Cal., consists of one line, known as the Beverly Boulevard Motor Coach Line, running between Los Angeles and Castellammare, a distance of approximately 23.8 miles. Castellammare is located on the coast, north of Santa Monica. This line serves a territory in which there is no other motor coach or street car service with the exception of a portion of the route within Los Angeles that is served by local lines of the Los Angeles Railway and Los Angeles Motor Coach Company. The line is restricted, however, in handling local traffic within the territory served by these other companies.

Twenty-nine passenger Yellow coaches equipped with individual, comfortably upholstered seats, are used on this route. Standees are not carried. Fares on the Beverly Boulevard Motor Coach Lines are on a slightly higher basis than on the other bus lines. The average one-way fare is 2.7 cents per mile, compared with the regular one-way fare basis of 2 cents per mile within a radius of 12½ miles from Los Angeles, and 2½ cents per mile outside of that zone.

The greater portion of the losses in the operation of this de luxe route is subsidized by a group of real estate operators owning extensive properties along the line. The line was established at their instance, approximately two years ago.

Through its subsidiary, the Shore Line Motor Coach Company, the Chicago, South Shore & South Bend Railroad operates a de luxe bus service between Chicago, Ill., and Benton Harbor, Mich., which is separated into two divisions, Chicago, Ill., to Michigan City, Ind., and Michigan City, Ind., to Benton Harbor, Mich. This route is 105 miles in length. The service operates through a territory just east of the Indiana-Illinois state line, which is also served with local street car operations. The equipment used on the de luxe service is of the parlor car type, whereas in the local operations the ordinary street car type of coach is used. The average speed on the de luxe route is 23⅓ miles per hour, whereas on the local routes the average is only 10 miles per hour.

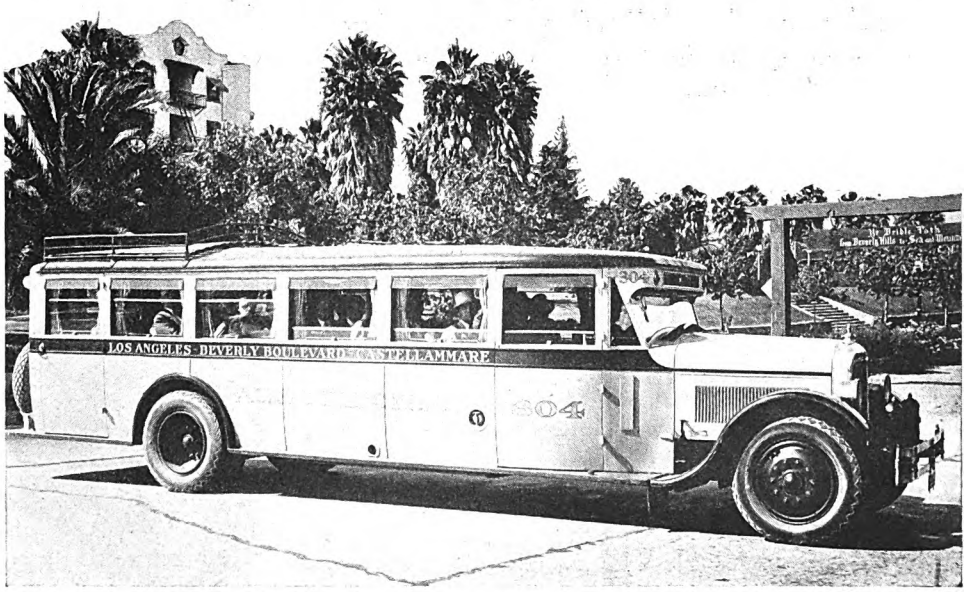
The Eastern Massachusetts Street Railway, Boston, Mass., operates one de luxe bus line, between Taunton, Mass., and Providence, R. I., the operation in Providence being joint with the United Electric Railways Company of that city. These cities are also connected by an interurban car line. The fare on the interurban line is 60 cents one way or $1 for a round trip, while on the bus line the fare is 50 cents one way and 75 cents a round trip. The reduced rate on the buses is due to very severe jitney competition. The bus line does local business over its route, but the fare and territory served tend to make it an express operation.



De luxe bus operations of Pennsylvania-Ohio System extend over wide area in the two states

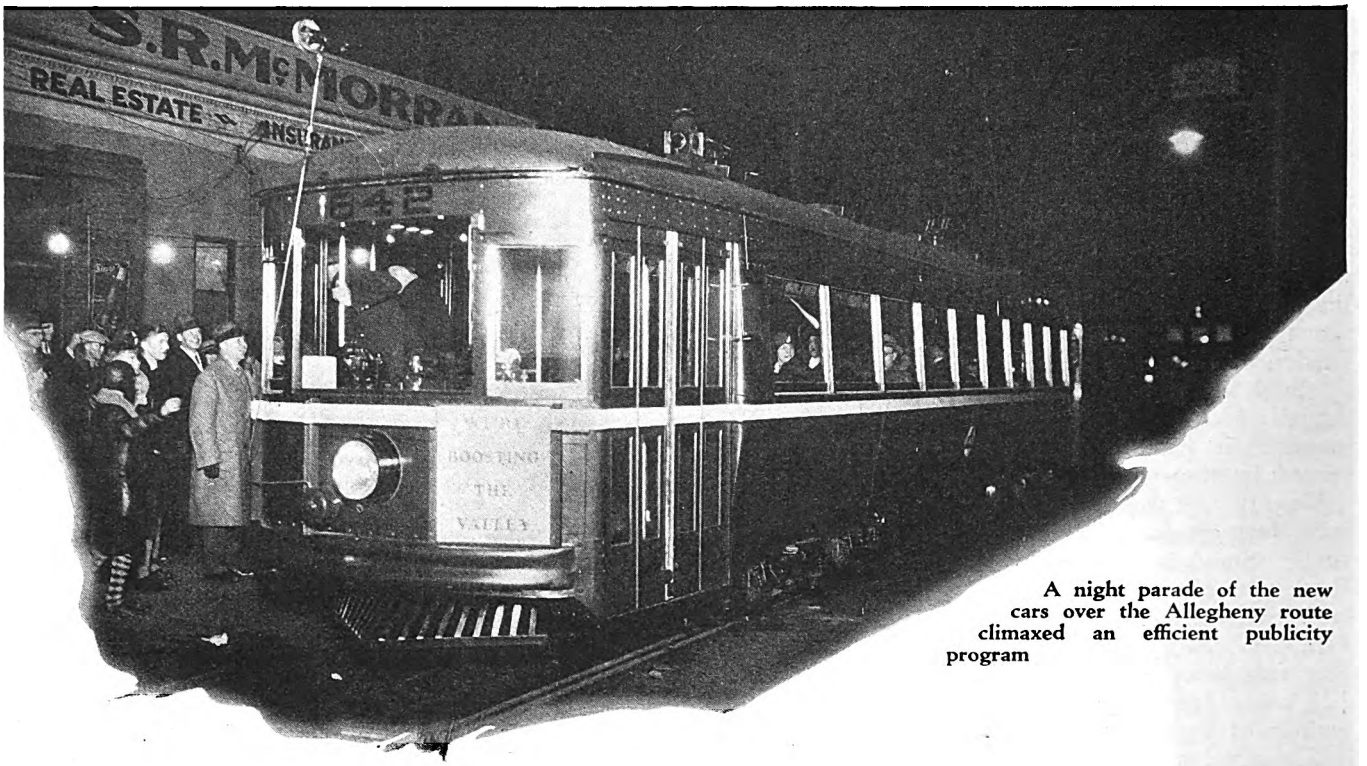
The Northern Ohio Power & Light Company on twelve intercity de luxe bus routes operates 50 buses over a total of 383 miles. Between Akron and Cleveland there are four routes using four different roads. Service is also supplied between Cleveland and Akron by interurban cars operated by this company. Two other de luxe bus lines, namely, between Akron and Wadsworth, and Akron and Edinburg, have interurban car competition. On the remainder of the routes there is neither car nor other bus competition. An accompanying map shows the territory served by the Northern Ohio Power & Light Company and the table gives the details of these lines.

The Pacific Northwest Traction Company and the North Coast Transportation Company operate in a main trunk line from Portland, Ore., through Washington, to Vancouver, B. C. The latter company also operates several small branch lines. Although a very high type of equipment is used and a de luxe service rendered, this line is classed as express, rather than de luxe. No standees are permitted on any of the lines unless in a case of emergency. The schedule speed, including stopovers, is approximately 28 m.p.h. No regular stopping places are scheduled, but the buses stop on signal from intending passengers. The coaches do not average more than one stop every 3 or 4 miles.



Parlor bus route from Los Angeles helps build up shore resort at Castellammare

Digitized by Google



A night parade of the new cars over the Allegheny route climaxed an efficient publicity program

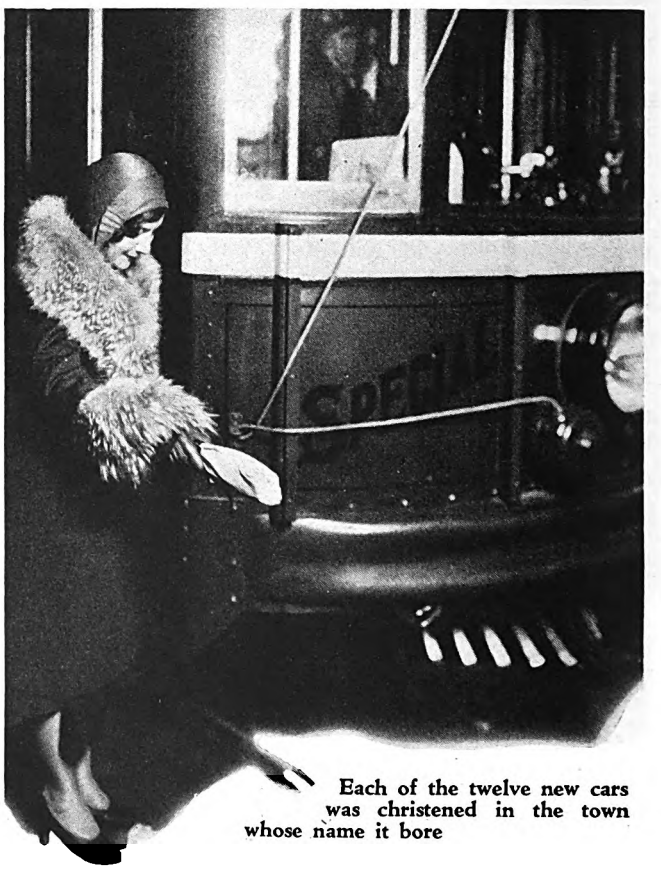
Complete Car Replacement

on Allegheny Valley Route

Twelve new cars have been placed in regular service following a three-day ceremony, including parade, public inspection and free riding

MODERNIZATION in practically every phase of operation was completed on the Allegheny Valley division of the West Penn Railways with the installation of twelve new cars on Feb. 14. An intensive and effective publicity campaign directed by the company and ably supported by the newspapers of the district laid the foundation for a three-day ceremony which included a parade of the new cars, public inspection of the cars in each town on the line and two hours of free riding.

This division, operated as the Allegheny Valley Street Railway, serves an industrial district lying on the west of the Allegheny River between Aspinwall and Natrona, Pa., with an extension across the river to New Kensington, Pa. The route is approximately



Each of the twelve new cars was christened in the town whose name it bore

Digitized by Google

Digitized by Google

at central locations in each town where they were open for inspection by the public. A representative of the company was in charge of each car during this time to answer any questions about the equipment or the new service. He also explained the safety devices and their adaptability to one-man operation, an innovation with the new cars. In every case the townspeople turned out in full force to inspect the new cars. On the following day, Sunday, between 2 and 4 p.m. the public was invited to ride free. Anyone boarding the cars between those two hours could make a trip at the company's expense and become familiar with the features of comfort and speed of the new cars.

The new cars were built by the Cincinnati Car Corporation, and were assembled at the West Penn shops in Connellsville, Pa. They are much lighter, faster and more comfortable than the old equipment. The length over all is 47 ft. 3 in.; width, 8 ft. 6½ in.; height, 10 ft. 3 in.; truck wheelbase, 5 ft. 4 in.; and the weight is approximately 31,000 lb. The truck is known as the Cincinnati Car Corporation's Type 101, the fundamental features of design being cantilever elliptic springs and wing type journal boxes. These have two coil springs per box, the box being movable vertically on rectangular slides which are held between the continuous tiebar underneath the boxes and the truck side frame by means of a through-bolt passing through the side frame, the rectangular slide and the bottom tiebar. Support of the motor by means of brackets attached to the truck side frame and a tube running across the truck from bracket to bracket is one of the features. Other specifications follow:

Air brakes	Westinghouse
Car signal system	Faraday
Curtain fixtures	National Lock Washer Company
Curtain material	Pantasote No. 86 M
Door mechanism	National Pneumatic C 10980
Doors	Folding
Floor covering	5/16-in. battleship linoleum
Glass	Plate
Hand brakes	Straight staff
Heat insulating mat rial	1-in. compressed cork
Heaters	Single coil panel type, Consolidated Car Heating Company
Headlights	Ohio Brass S.O.S. stationary type
Headlining	¼-in. Agasote
Journal bearings	Plain 3¼x7½ in.
Journal boxes	3¼x7-in. pedestal type
Motors	4 Westinghouse No. 1425-A, inside hung
Registers	Ohmer
Roof type	Arch
Roof material	No. 8 canvas
Seats	Reversible type cross-seats, 37-in. long
Seat spacing	32-in.
Seating material	Brown Spanish leather
Steps	Stationary
Trolley	Retrievers, Earl No. 4
Trolley base	West Penn standard
Trucks	Cincinnati Type 101
Ventilators	Ten Nichols-Lintern
Wheels	Rolled steel 22-in. diameter.

Accident Causes Analyzed at Cleveland

INSTRUCTIVE information concerning the cause of accidents on the Cleveland Railway has been developed by an investigation made by the company in collaboration with the Metropolitan Life Insurance Company. The data are based on an intensive study extending over a period of months and embracing the records of 167 motormen at the Woodhill station. To determine which operators were particularly prone to accident, the 1928 record of each motorman at the station was carefully studied. Accidents from all causes were included in determining an individual record so that all contributing factors might be given consideration.

It developed that there was a definite relationship between accident frequency and the length of service of the motormen, the veteran men in general having fewer accidents than the new men. It was shown that the motormen with unsatisfactory accident records were also inclined to use an excessive amount of power when operating their cars. No relationship was found to exist between accident frequency and delinquencies in reporting for work, tardiness, absence, etc.

Physical difficulties, such as defective vision, organic diseases, high blood pressure, etc., were found to be primarily responsible for about 12 per cent of the accidents. In 22 per cent of the cases an improper attitude of mind, or a personality unsuited to the work, was found to be a primary factor. The remaining 66 per cent were attributable to shortcomings such as failure to recognize potential hazards, inattention to work, etc.

"Dark Period" Before Sunrise Creates Accident Hazard

EXISTENCE of an accident hazard not generally recognized is indicated by investigations made recently by the Capital Traction Company, Washington, D. C., under the direction of H. V. Schreiber, safety engineer. These investigations were directed toward ascertaining conditions which exist during the "dark period" after the street lights have been extinguished and before sunrise. Because the company has a considerable number of vehicles in operation on the streets during the early morning hours, this study is of particular interest to the railway, but it was extended to include also the general collision hazard.

In Washington, as in most cities, the street lights are operated on the 4,000-hour schedule. This is roughly equivalent to lighting the lamps one half-hour after sunset and extinguishing them one half-hour before sunrise. An interesting exception to the usual practice in this regard is found in St. Louis where astronomical clock control is used to turn on the lights automatically at sunset and turn them off at sunrise.

Data furnished by the Weather Bureau in Washington show that a large proportion of days are cloudy, foggy, or rainy at sunrise. During the three years from Oct. 25, 1926, to Oct. 24, 1929, there were on the average 5.1 days per month when the weather was rainy, 12.9 days when the weather was cloudy, and 12.7 days when the visibility was poor for one reason or another. Monthly averages are given in the following table:

Three-Year Average of Weather Conditions at Sunrise

Month	Rainy Days	Cloudy Days	Poor Visibility Days
January	7.0	14.3	19.0
February	8.0	10.0	16.3
March	7.0	12.7	11.5
April	3.7	12.6	8.1
May	4.7	16.3	11.4
June	3.0	14.3	5.9
July	2.0	16.3	6.6
August	1.7	21.3	9.8
September	3.7	15.0	12.2
October	6.3	10.4	16.3
November	6.0	16.7	16.8
December	8.3	13.7	18.6
Average	5.1	12.9	12.7

These figures were further classified by the Weather Bureau to show the approximate distance at which objects could be distinguished on foggy mornings.

Digitized by Google

Average Visibility Distance on Foggy Days

Month	50 M	200 M	500 M	1,000 M	2,000 M	Total
January	0.9	1.0	3.8	5.2	8.1	19.0
February	0.1	0.6	3.5	5.2	6.9	16.3
March	0.2	0.3	0.3	3.6	7.1	11.5
April	...	0.1	1.1	1.7	5.2	8.1
May	...	...	1.9	1.4	8.1	11.4
June	...	...	0.8	2.0	3.1	5.9
July	...	...	0.5	1.8	4.3	6.6
August	0.1	0.1	1.4	2.0	6.2	9.8
September	0.3	0.1	1.4	3.6	6.8	12.2
October	0.4	0.4	2.5	4.0	9.0	16.3
November	0.1	0.2	3.4	4.9	8.2	16.8
December	0.8	0.5	1.9	6.0	9.4	18.6

As to the actual occurrence of accidents during this period of the day, complete data are not available. The company's records, however, show some twenty collisions which occurred during the dark period in a year's time. Also the company had one negro track greaser killed by an automobile while he was at work. Records of the Traffic Bureau covering a period from January, 1926, to September, 1929, show 167 accidents during these hours.

Four-Year Accident Record for Dark Period

Month	Time A.M.	Accidents Fatal	Accidents Non-fatal
January	6:30–7:30	3	28
February	5:30–6:30	1	13
March	5:30–6:30	0	11
April	4:30–5:30	0	11
May	4:30–5:30	0	4
June	3:30–4:30	0	11
July	4:30–5:30	0	9
August	4:30–5:30	1	9
September	5:30–6:30	0	8
October*	5:30–6:30	2	13
November*	5:30–6:30	2	10
December*	6:30–7:30	2	29
Total		11	156

*Three years only.

From these figures the conclusion is reached that the prevention of accidents during this "dark period" justifies the extension of the lighting schedule in order to protect properly all users of the streets on cloudy, foggy and rainy days.

LETTER TO THE EDITOR

Statistics on Pittsburgh Railways Securities Amplified

INFORMATION on the Pittsburgh bonds published in the Annual Statistical Number was based on compilations by well-known financial authorities, supplemented by statements sent directly to the editors. The omissions of disposition of the Pittsburgh securities in Table III was made because correct information was not obtainable up to the time of going to press. The statement of defaults of interest is similar to that published in the Annual Statistical Number of the JOURNAL for Jan. 12, 1929, and the same bonds are included in the earlier list. Where the maturity date is given in the table of bonds in default it is assumed that both principal and interest remain unpaid. In the present instance the interest is being met, although bonds are in default of principal.

The JOURNAL is glad to have this information and to publish it as an addition and correction to that given in the article referred to.—EDITORS.

Pittsburgh Railways Company

PITTSBURGH, PA., Jan. 31, 1930.

To the Editor:

Our attention has been called to an article on page 44 of ELECTRIC RAILWAY JOURNAL for January, in which we find a number of incomplete statements with respect to matured bonds on the properties operated by the Pittsburgh Railways Company:

TABLE III—DISPOSITION OF ELECTRIC RAILWAY MATURITIES IN 1929

The $200,000 of Pittsburgh Railway equipment trust, due Feb. 1, 1929, were retired.

The Central Traction Company firsts, due July 1, 1929, in the amount of $325,500 have not been extended. The principal is in default, but interest is being paid each six months at the rate of 5 per cent per annum.

The Wilkinsburg & East Pittsburgh Street Railway firsts, due Sept. 1, 1929, in the amount of $1,989,000 were refunded by an issue of Monongahela Street Railway first refunding mortgage 5 per cent bonds, due Dec. 1, 1958.

TABLE VIII—OUTSTANDING ELECTRIC RAILWAY BONDS IN DEFAULT OF INTEREST

Included in this table are the following issues of mature bonds of the Pittsburgh Railway system which are in default with respect to the payment of principal, but upon which interest has been and is being paid in full, semi-annually:

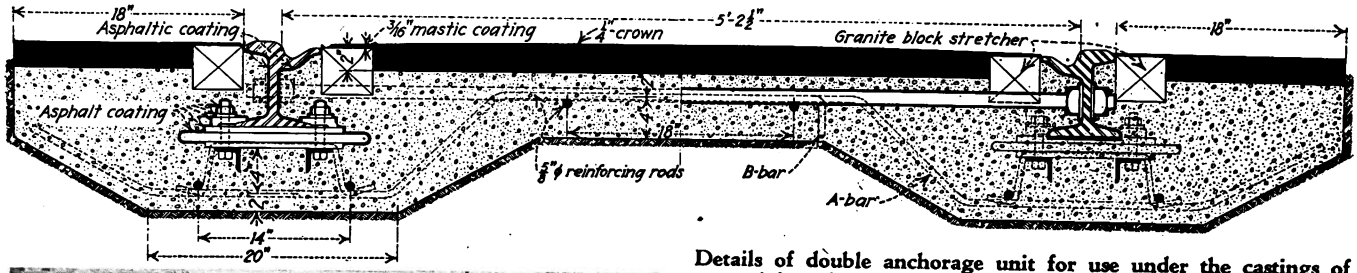
	Amount	Matured
Bloomfield Street Railway 5's	$250,000	Aug. 1, 1923
Brownsville Avenue Street Railway 5's	300,000	Aug. 1, 1926
Centra Passenger Railway 6's	125,000	Oct. 1, 1924
Citizens Traction Company 5's	246,000	Oct. 1, 1927
Millval., Etna & Sharpsburg Street Railway 5's	741,000	Nov. 1, 1923
Penn Street Railway 5's	250,000	Dec. 1, 1922
Pittsburgh, Crafton & Mansfield Street Railway 5's	164,000	July 1, 1924
Pittsburgh Traction Company 5's	666,000	Oct. 1, 1927
Pittsburgh & West End Passenger Railway 5's	303,000	July 1, 1922
Washington Electric Street Railway 5's	125,000	Feb. 1, 1927

There is also included in this table $993,000 principal amount of Monongahela Street Railway 5's which mature June 1, 1898, and were refunded by a similar amount of first refunding mortgage 5 per cent bonds of that company, due Dec. 1, 1958; also, $1,989,000 principal amount of Wilkinsburg & East Pittsburgh Street Railway 5's, due Sept. 1, 1929, which were refunded by the issue of a similar amount of Monongahela Street Railway first refunding mortgage 5 per cent bonds, due Dec. 1, 1958.

The $1,500,000 principal amount of Pittsburgh & Birmingham Traction 5's due Nov. 1, 1929, were extended, at the same rate of interest, to Nov. 1, 1930.

As the interest on all outstanding matured and unmatured bonds of the Pittsburgh Railway System has been and is being paid, when due, we would thank you to publish in the next issue of the ELECTRIC RAILWAY JOURNAL, a statement correcting the erroneous statements published in the January issue with respect to the bond issues indicated above. C. S. MITCHELL.
Controller.

Digitized by Google



Details of double anchorage unit for use under the castings of special work. The bolt holes in the plate are slotted to permit fastening to variable width special work castings

Completed section of tieless track laid in New Orleans. Steel reinforcement is in place and ready for pouring of concrete

TRACK

By

I. O. Mall

Assistant Superintendent of Roadway
New Orleans Public Service, Inc.

ENGINEERS of the New Orleans Public Service are of the opinion that the design of paved track is susceptible of rational analysis and that a paved track to be economically satisfactory must combine the materials of construction in the most scientific manner. With this thought in mind the matter was approached as an original problem in engineering design and a design was developed differing radically from ordinary practice. The track structure consists primarily of a reinforced concrete foundation to which the rails are anchored in parallel surface and alignment by means of resilient rail anchorages.

Due to the commercial considerations involved in the manufacture of steel rails, the existing A.E.R.E.A. standard 7-in. girder rail was chosen for use and the track structure developed around this rail. Analysis determined the requirements of the rail anchorage, and since a unit was not available on the market, a new design was developed. The resilient rail anchorage utilized in this construction was subjected to detail development tests and its dimensions and properties proportioned to meet service conditions.

The foundation is shaped so as to form a continuous girder beneath each rail. The reinforcement consists of $\frac{5}{8}$-in. straight and deformed bars placed both longitudinally and transversely at points where they will efficiently resist the stresses set up in the foundation. Just beneath and parallel to each rail are two continuous longitudinal angles embedded in the concrete to which are fastened the rail anchorage units. These angles are held in parallel alignment by deformed straps welded to the angles at the points of contact. These same deformed straps support and carry the entire system of bar reinforcement.

The resilient rail anchorage consists of two oval-shaped thin steel plates crimped on the outer edges over a round steel ring and welded at the periphery to form a closed container. This weld fuses the edges of the plates together and the whole is fused to the steel ring, forming a very stable marginal periphery within the diaphragm. An oval-shaped bearing plate is welded to both the top and bottom diaphragm plates. These bearing plates are substantially smaller than the diaphragm plates and concentric therewith. The rail is held in place by rail clips, the anchorage bolts passing through the diaphragm and bearing against the embedded angles in the foundation. The inside of the diaphragm contains an asphalt-asbestos mixture forced into place under pressure and while hot.

The load from the rail is transmitted through the upper bearing plate to the top of the diaphragm. As the diaphragm plate flexes inward a compression is built up in the confined asphalt-asbestos cushion and this pressure is reacted to by the bottom bearing plate of the diaphragm which in turn transmits the load to the foundation. When the load is relieved the residual compression in the cushion acting in conjunction with the resilient diaphragm plates returns the upper bearing plate to its normal position. The asphalt-asbestos cushion serves a dual purpose in that it affords stability to the diaphragm and aids in dissipating the vibration absorbed from the rail.

The resilient rail anchorages are spaced on 4-ft. centers and staggered with respect to parallel rails, this latter feature minimizing the foundation stresses. The steel bar reinforcement in the foundation is so distrib-

Digitized by Google

Design adopted after prolonged experimentation has little resemblance to usual types. Reinforced concrete foundation acts as unit to hold rails in position. First cost is $75,000 per mile. Maintenance cost is estimated at less than $100 per mile per year

Without TIES

Built at New Orleans

After the trench is graded, precast concrete pedestals are placed in position. The steel framework, made up in 20-ft. sections with anchorages attached, is then placed in position over the pedestals

uted as to absorb the live-load and temperature stresses developed in street service.

The reinforced concrete foundation acts as a unit to hold the rails in parallel surface and alignment and in this capacity displaces the conventional crosstie used in track construction.

Rails are maintained independent of the pavement by being coated with approximately ¼ in. of plastic asphaltic mixture. This material maintains its normal plastic condition under the maximum and minimum temperatures that are met. This coating functions as a vibration insulator and prevents water from entering between the pavement and the rail. An Elastite strip ¼ in. in thickness is placed under the base of the rail and held in place by special wire clamps. Thus the foundation and pavement concrete is not allowed to come into bonding contact with the rail and sufficient leeway is provided for the resilient action of the rails.

Basic advantages of this type of track construction are believed to be:

1. Proper recognition of the dynamic action produced in the rail by the progressive movement of a rolling wheel load.

A moving wheel load is essentially a moving impact load. The entire wheel load is concentrated on a narrow line area on the surface of the rail. If the rail cannot give slightly and ease the shock of the suddenly applied load the intense local stress developed in the surface structure of the rail approaches and sometimes exceeds the bearing strength of the steel. As a consequence the rail wears away rapidly, due not so much to abrasion as to the peening action of rolling.

If, however, the rail can give or deflect slightly with a resilient reaction, the impact stress is distributed over the cross-sectional area of the rail body with a lessened intensity of local stress. Commercial steel rails are of a beam section which gives them stiffness and a resilient capacity when acting as a beam. Due to the stiffness of the rail the deflection wave tendency extends a considerable distance on either side of the wheel loads. In order to permit elastic reaction in the rail, sufficient resiliency is provided in the rail anchor-

Rails in position with the anchorages attached and clips tightened. Wooden wedge blocks are used on top of pedestals to obtain surface grade adjustment

Digitized by Google

The rail is coated with about ¼ in. of plastic asphalt material applied with a paddle as shown

ages to allow the deflection wave to spread out and proceed uniformly.

The effect of resilient rail action within controlled limits on rail life is of course problematical. Experience in New Orleans with approximately 100 miles of ballasted track without pavement, which is flexible rather than resilient, indicates that rail failure will result from fatigue rather than from abrasive and rolling wear. It seems logical to conclude that rail life under a given tonnage movement will be very materially increased over that obtained in the past with rigid rail construction.

2. Rail anchorage has durable resilient properties and allows resilient movement without mechanical wear.

The resiliency of the rail anchorage is dependent upon the flexing action of the diaphragm plates. The diaphragm is designed so that a load of 10,000 lb. causes it to deflect 0.025 in. Thus the banding stresses set up in the plates are very small and the plates should have a long fatigue life. The asphalt-asbestos cushion is inert and confined so that it cannot be dissipated. Properly protected from corrosion and electrolysis the life expectancy of the anchorage is certainly commensurate with the rest of the structure.

Firm anchorage to the foundation in conjunction with resiliency in the rail support is provided by extending the anchorage bolts through the reinforcing angles in the foundation. Repeated impact tests over a long period of time show that vibrations set up in the rail are absorbed by the diaphragm and this destructive action is eliminated before it reaches the pavement.

It has been thoroughly demonstrated in industrial practice that surfaces in variable pressure contact with bolts are most effectively held tight when a resilient element is incorporated at the plane of surface contact. This element of design is provided in the diaphragm. It is important to note also that movement in the rail anchorage occurs without attendant mechanical wear, a factor which assures uniform action throughout its life. Attention is also called to the action of the diaphragm which permits a lateral or tipping action of the rail. This allows the rail and wheel to make full contact under variable conditions of wear and improves the adhesion characteristics between the wheel and the rail.

3. Rail action is maintained independent of and not constrained by the surrounding pavement with a water-tight seal between the rail and the pavement.

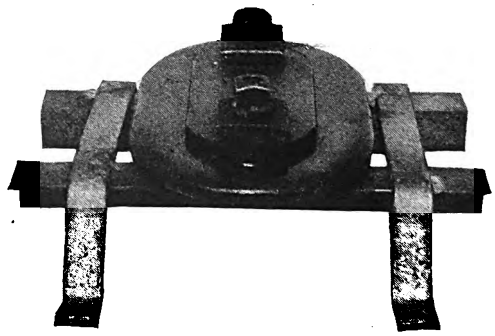
With a uniformly controlled rail movement it becomes possible to separate the rail and the pavement with an assurance of maintaining water-tight construction. The sealing material between the rail and the pavement breaks the line of vibration and materially reduces and deadens the operating noises. The asphalt is impervious to water and is protected from atmospheric reactions which might cause it to deteriorate.

4. Design provides for unlike strength and elastic properties of rails and concrete foundation in resisting the effect of expansion and contraction due to temperature change.

Under the influence of temperature change the rail acts independently of the foundation. Expansion builds up a compressive stress in the rail. The rail fastenings hold the rail to alignment and prevent buckling, and the compressive stress is absorbed in the rail. Contraction builds up a tension in the rail which requires no assistance from the fastenings in holding the rail to alignment.

Expansion and contraction of the reinforced concrete foundation occur independently of the rails in accordance with the elastic properties of the unit. Steel and concrete have the same coefficient of expansion, but due to their unlike strength and elastic properties they cannot act together under the influence of temperature change. Steel rails have sufficient strength to resist the range of temperatures encountered in service. Concrete does not have sufficient strength to resist the range of temperatures encountered, the failure being due to contraction with attendant cracking. Sufficient steel bar reinforcement to prevent and control visible cracking has been utilized in this design to provide for flexural load stresses acting in conjunction with temperature stresses.

Pneumatic hammers with block tool points were used to drive the concrete thoroughly to place in the foundation



Single rail anchorage unit for use under curve rails

5. The foundation and base pavement are made integral and the reinforced unit precludes the use of a conventional crosstie member.

Integral construction of the foundation and pavement concrete into a monolithic mass provides maximum strength with a minimum of material. The introduction of steel bar reinforcement controls and stabilizes the concrete which is in accordance with the fundamental requirements of a

Digitized by Google

properly designed concrete structure. Sufficient time has not elapsed in the industrial world to prove the life expectancy of reinforced concrete but it can logically be expected to have a life far greater than concrete without reinforcement.

As long as the concrete maintains its homogeneous stability the rails will be held in parallel surface and alignment. The conventional crosstie, when embedded in concrete, functions only as an anchorage for holding the rails. In this design the steel which would commonly be utilized as a direct member between the rails has been incorporated as bar reinforcement in the concrete foundation and the crosstie eliminated.

Tie rods are used at sufficient intervals between the rails to hold them in a parallel position and to facilitate proper alignment during construction. They are covered with asphaltic material to prevent their bonding to the concrete, which in turn prevents their interfering with the resilient action of the rail.

6. Marginal stability of the pavement alongside the rails permits the use of an asphalt surface pavement.

The granite paving block laid parallel to the rail and embedded in the green concrete provides lateral stability for the edges of the asphalt pavement. An asphalt pavement protected in this manner can develop its full life without destruction. The surface pavement is renewable without disturbance to the rest of the structure. The cushioning of the traffic wheel load inherently gained with asphalt pavement adds materially to the life expectancy of the concrete foundation.

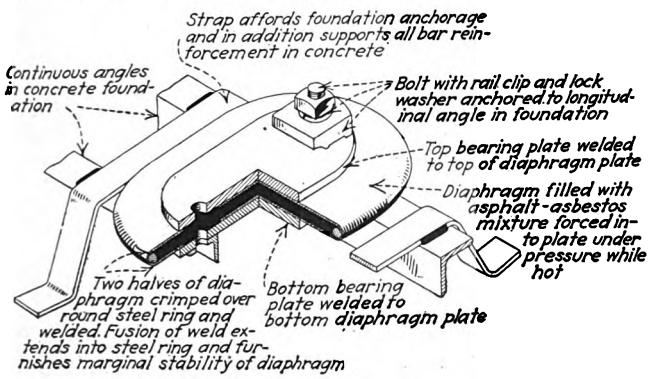
7. Design provides for renewal of rail with minimum disturbance of surface pavement and no disturbance at all to the foundation.

The rail may be removed by breaking out the granite block and sufficient concrete between the block and the rail to allow access to the clip fastenings. On the assumption that the resilient rail will fail ultimately, its replacement can be made without disturbing the foundation.

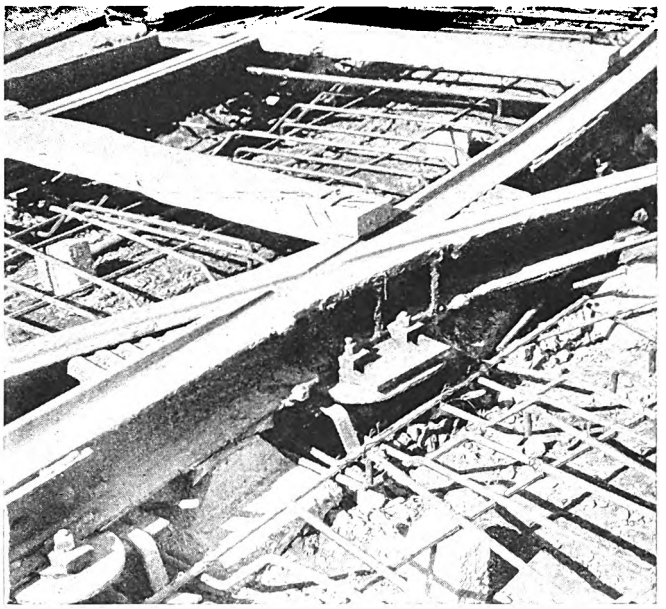
8. First cost of this type of construction is high, but this is offset by the reduced cost of maintenance and the longer life.

It is obvious that this design is not a cheap construction. Comparison with rigidly constructed track utilizing steel crossties shows that the differential cost factor between the two is based upon rail anchorage cost. Manufacture of the resilient rail anchorages on a production basis has potential possibilities of balancing the cost of steel in the two units of construction. The track constructed on the project as outlined in this article cost $75,000 per mile.

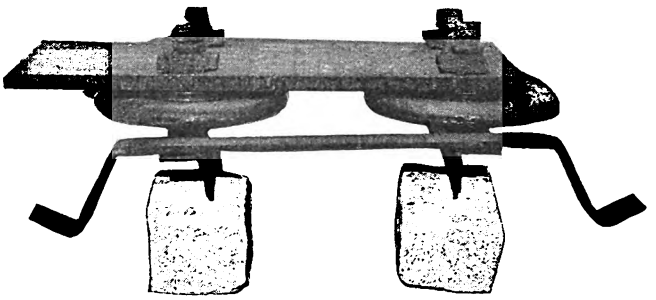
Analysis of the maintenance requirements of this design indicates that there should be practically no maintenance at all. In fact, an underlying motive in the development of the design was to construct a track that would require no major maintenance. If the structure holds up as it should and as has been proved by concentrated tests, track maintenance will be confined to welding and grinding at the joints and to repairs of the asphalt pavement occasioned by vehicular traffic.



Details of resilient rail anchorage



New design of track being tried in New Orleans differs from customary practice in that no ties are used



Application of double anchorage unit under silico-manganese frog. Clips are adjusted to fit the base of the casting and then welded to base plate and to frog casting

While it is desirable from the investment point of view to keep the first cost as low as possible, this should not be done at the expense of subsequent maintenance and depreciation. Longer life with reduced maintenance justifies a higher first cost. Our analysis indicates an average maintenance cost not exceeding $100 per mile per year throughout its full life, and a depreciation rate of not greater than 3 per cent to cover renewals and replacements.

This design of track has been used in the reconstruction of Canal Street at New Orleans in which four parallel tracks occupy the center of the street in a raised neutral strip 56 ft. wide. This strip is paralleled by 35-ft. roadways on either side. The construction involves approximately 4 miles of tangent track interlaced with 32 special work layouts. Three-fourths of the special work layouts and over one-half of the tangent tracks were constructed under car operation.

Single Life vs. Renewable Track

Opinions of prominent way engineers on this interesting subject will be presented in the April issue

Digitized by Google

Monthly and Other Financial Reports

Gains in Gross and Net Income Seen in January on Numerous Properties Over Last Year

		Operating Revenue	Operating Expenses	Taxes	Gross Income	Net Income
		$	$	$	$	$
Market Street Railway, San Francisco, Cal.						
January, 1930		781,528	674,048a	.....	107,480	51,347
January, 1929		789,713	688,090a	.....	101,623	41,944
12 mo. end. Jan., 1930		9,582,008	8,029,052a	.....	1,552,956	846,916
12 mo. end. Jan., 1929		9,736,269	8,323,864a	.....	1,413,405	673,789
Capital Traction Co., Washington, D. C.						
December, 1929		377,088	259,420	23,894	99,168	67,240
December, 1928		375,666	260,989	30,038	89,835	57,339
Jacksonville Traction Co., Jacksonville, Fla.						
December, 1929		101,549	76,474	8,075	16,393	.....
December, 1928		104,290	84,260	5,775	13,601	.....
12 mo. end. Dec., 1929		1,141,139	928,589	108,890	97,533	*60,421*
12 mo. end. Dec., 1928		1,199,516	971,149	106,774	115,154	*48,864*
United Railways & Electric Co., Baltimore, Md.						
December, 1929		1,470,831	972,529	152,554	362,263	80,723
December, 1928		1,431,039	968,459	129,156	350,009	65,879
12 mo. end. Dec., 1929		16,717,099	11,335,024	1,635,733	3,921,934	534,856
12 mo. end. Dec., 1928		16,273,806	10,873,921	1,578,782	3,971,926	558,393
Boston Elevated Railway, Boston, Mass.						
December, 1929		3,105,111	2,030,450	100,801	978,710	286,824
December, 1928		3,153,656	2,085,649	145,689	926,655	225,043
Boston, Revere Beach & Lynn R.R., Boston, Mass.						
3 mo. end. Dec.,	1929	285,865	253,617	3,692	29,446	*7,281*
3 mo. end. Dec.,	1928	281,658	265,439	9,146	6,936	*5,371*
12 mo. end. Dec.,	1929	1,271,014	1,002,418	33,769	237,681	90,520
12 mo. end. Dec.,	1928	1,222,093	1,068,548	43,896	112,591	61,894
Eastern Massachusetts Street Railway, Boston, Mass.						
January, 1930		758,812	448,284	37,755	282,360	82,456
January, 1929		796,402	491,090	35,716	286,830	80,691
Springfield Street Railway, Springfield, Mass.						
3 mo. end. Dec.,	1929	.....	.....	.....	135,922	64,226
3 mo. end. Dec.,	1928	.....	.....	.....	173,971	101,187
12 mo. end. Dec.,	1929	.....	.....	.....	499,387	209,046
12 mo. end. Dec.,	1928	.....	.....	.....	567,019	282,102
Worcester Consolidated Street Railway, Worcester, Mass.						
3 mo. end. Dec.,	1929	.....	.....	.....	158,996	49,244
3 mo. end. Dec.,	1928	.....	.....	.....	188,205	65,924
12 mo. end. Dec.,	1929	.....	.....	.....	639,015	184,050
12 mo. end. Dec.,	1928	.....	.....	.....	620,314	150,036
Department of Street Railways, Detroit, Mich.						
January, 1930		2,165,113	1,810,502	65,090	297,796	149,123
January, 1929		2,400,419	1,961,002	62,545	398,509	270,456
12 mo. end. Jan.,	1930	26,209,568	20,907,042	753,494	4,654,066	2,981,856
12 mo. end. Jan.,	1929	24,969,027	19,576,192	778,592	4,861,680	2,978,992
Duluth-Superior Traction Co., Duluth, Minn.						
12 mo. end. Dec.,	1929	1,780,428	1,476,499	140,770	181,739	12,756
12 mo. end. Dec.,	1928	1,873,330	1,535,170	153,562	218,394	49,222
Kansas City Public Service Co., Kansas City, Mo.						
December, 1929		771,361	624,081	43,361	103,918	28,072
January, 1930		761,935	603,911	41,675	116,348	41,741
12 mo. end. Dec.,	1929	8,951,616	6,825,216	501,786	1,624,612	698,223
Illinois Terminal Co., St. Louis, Mo.						
December, 1929		586,313	363,381	29,262	193,670	145,491*f*
December, 1928		573,945	588,692	22,495	*37,252*	*97,426f*
12 mo. end. Dec.,	1929	7,163,425	5,015,064	264,072	1,884,156	1,384,966*f*
12 mo. end. Dec.,	1928	6,717,136	5,101,080	305,320	1,310,648	868,179*f*
Lincoln Traction Co., Lincoln, Neb.						
12 mo. end. Dec.,	1929	475,318	415,788a	.....	60,614	12,419
12 mo. end. Dec.,	1928	480,033	389,714a	.....	91,889	31,066
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.						
December, 1929		95,637	65,196	*8,384e*	45,823	13,795
December, 1928		89,769	67,772	*6,146e*	37,855	4,610
12 mo. end. Dec.,	1929	1,025,933	760,871	70,775	317,053	*64,077*
12 mo. end. Dec.,	1928	1,036,155	749,352	75,963	312,545	*70,240*
Brooklyn-Manhattan Transit Corporation, New York, N. Y.						
January, 1930*d*		5,134,097	3,383,385	353,454	1,492,346	715,528
January, 1929		3,977,564	2,595,745	288,281	1,149,078	439,808
7 mo. end. Jan.,	1930*d*	35,544,051	23,805,477	2,253,662	10,001,305	4,566,659
7 mo. end. Jan.,	1929	28,112,915	18,306,475	1,941,116	8,412,423	3,545,950
Brooklyn & Queens Transit Corporation, New York, N. Y.						
January, 1930		1,971,577	1,550,153	117,113	325,940	191,390
January, 1929		1,962,740	1,687,814	104,381	191,155	63,791
7 mo. end. Jan.,	1930	13,907,132	10,969,673	800,103	2,287,688	1,403,534
7 mo. end. Jan.,	1929	14,071,065	11,729,520	748,730	1,743,678	842,757
Fifth Avenue Coach Co., New York, N. Y.						
September, 1929		556,691	450,950a	.....	132,539	131,926
September, 1928		559,065	474,352a	.....	105,103	102,838
3 mo. end. Sept.,	1929	1,674,774	1,414,154a	.....	332,555	330,718
3 mo. end. Sept.,	1928	1,735,911	1,466,949a	.....	326,723	319,254
Hudson & Manhattan R.R., New York, N. Y.						
January, 1930		1,087,684	552,211a	.....	535,473	200,855
January, 1929		1,060,890	545,945a	.....	514,945	179,428
Long Island Railroad, New York, N. Y.						
December, 1929		3,110,384	2,410,946	133,390	557,998	418,569*f*
December, 1928		3,128,417	2,407,285	128,258	592,514	422,613*f*
12 mo. end. Dec.,	1929	41,326,194	27,734,679	2,922,226	10,649,328	8,707,943*f*
12 mo. end. Dec.,	1928	40,532,572	28,434,357	2,688,837	9,390,508	7,542,458*f*
New York, Westchester & Boston Ry., New York, N. Y.						
December, 1929		216,830	142,343	26,437	49,108	*249,249*
December, 1928		204,911	153,697	19,947	32,544	*184,190*
12 mo. end. Dec.,	1929	2,530,488	1,570,218	275,817	696,912	*1,970,995*
12 mo. end. Dec.,	1928	2,390,398	1,622,858	239,672	540,522	*1,908,498*
Staten Island Rapid Transit Co., New York, N. Y.						
December, 1929		196,274	90,670	18,448	87,156	77,226*f*
December, 1928		242,433	164,611	17,166	60,656	22,715*f*
12 mo. end. Dec.,	1929	2,637,897	1,892,347	210,265	535,285	460,515*f*
12 mo. end. Dec.,	1928	3,127,661	2,103,175	225,874	798,612	349,650*f*
Third Avenue Railway, New York, N. Y.						
January, 1930		1,254,726	982,045	90,508	201,424	*43,648*
January, 1929		1,259,493	1,006,331	86,647	184,410	*84,211*
7 mo. end. Jan.,	1930	8,926,444	6,894,688	624,850	1,545,597	*253,858*
7 mo. end. Jan.,	1929	9,050,681	7,005,433	642,216	1,535,670	*238,583*
Schenectady Railway, Schenectady, N. Y.						
3 mo. end. Dec.,	1929	417,999	376,179	22,307	20,613	*44,102*
3 mo. end. Dec.,	1928	429,636	357,955	23,330	48,519	*9,478*
York Railways, York, Pa.						
12 mo. end. Dec.,	1929	2,841,235	.....	.....	1,298,216	769,987
12 mo. end. Dec.,	1928	2,688,422	.....	.....	1,254,644	724,511
Galveston-Houston Electric Railway, Houston, Texas						
December, 1929		42,559	24,816	3,644	14,097	.....
December, 1928		50,088	28,053	2,493	19,539	.....
12 mo. end. Dec.,	1929	584,490	329,020	32,356	223,306	*46,654*
12 mo. end. Dec.,	1928	643,800	373,360	31,768	238,671	*31,138*
Houston Electric Co., Houston, Texas						
December, 1929		286,365	175,540	6,379	104,445	.....
December, 1928		289,477	183,722	16,922	88,831	.....
12 mo. end. Dec.,	1929	3,375,857	2,085,804	273,926	1,027,859	629,190
12 mo. end. Dec.,	1928	3,343,294	2,059,957	291,672	991,664	580,963
Memphis Street Railway, Memphis, Tenn.						
November, 1929		241,964	154,206a	.....	87,761	43,343
November, 1928		242,444	160,848a	.....	83,660	40,439
12 mo. end. Nov.,	1929	2,918,268	2,004,288a	.....	914,896	387,920
12 mo. end. Nov.,	1928	2,926,468	1,945,590a	.....	984,207	467,404
Pacific Northwest Traction Co., Seattle, Wash.						
December, 1929		84,961	49,642	2,896	32,421	.....
December, 1928		70,366	63,983	4,043	2,338	.....
12 mo. end. Dec.,	1929	964,072	717,375	54,176	192,518	76,303
12 mo. end. Dec.,	1928	881,076	736,776	51,644	92,654	*62,601*
Edmonton Radial Railway, Edmonton, Alta.						
November, 1929		72,647	45,842	.....	27,304	1,956
November, 1928		59,656	44,492	.....	25,161	3,418
11 mo. end. Nov.,	1929	763,602	494,664	.....	268,887	9,528
11 mo. end. Nov.,	1928	726,278	485,301	.....	242,977	802
Lethbridge Municipal Railway, Lethbridge, Alta.						
November, 1929		5,244	4,327	.....	917	*1,669*
November, 1928		.....	.....	.....	.....	*2,218*
11 mo. end. Nov.,	1929	55,542	45,502	.....	10,040	*18,400*
11 mo. end. Nov.,	1928	.....	.....	.....	.....	*24,824*
British Columbia Electric Railway, Vancouver, B. C.						
December, 1929		1,255,522	934,286a	.....	321,236	.....
December, 1928		1,228,405	806,221a	.....	422,184	.....
Regina Municipal Railway, Regina, Sask.						
December, 1929		47,970	27,323	.....	20,647	8,854
December, 1928		.....	.....	.....	.....	10,075
12 mo. end. Dec.,	1929	431,407	262,254	.....	169,153	27,632
12 mo. end. Dec.,	1928	.....	.....	.....	.....	10,293
Saskatoon Municipal Railway, Saskatoon, Sask.						
November, 1929		31,408	22,764	1,442	7,202	*3,313*
November, 1928		.....	.....	.....	.....	3,271
11 mo. end. Nov.,	1928	349,845	231,349	13,791	104,704	8,235
11 mo. end. Nov.,	1928	.....	.....	.....	.....	6,858
Havana Electric Railway, Havana, Cuba						
3 mo. end. Dec.,	1929	1,440,630	1,165,782a	.....	283,594	123,136
3 mo. end. Dec.,	1928	1,350,936	1,116,879a	.....	242,526	81,562
12 mo. end. Dec.,	1929	5,694,051	4,608,568a	.....	1,116,940	473,580
12 mo. end. Dec.,	1928	5,415,175	4,494,473a	.....	959,873	315,922

Italic figures indicate deficit. *a* Includes taxes. *b* Net operating revenue. *c* Before taxes. *d* Including Brooklyn & Queens Transit System. *e* Credit. Net after rents.

Digitized by Google

Prizes Awarded for

First Period of New Maintenance Contest

Atlanta and Cleveland Railway men are winners in way and structures, rolling stock and shops, and bus departments. No award made in the electrical and line department.

James Davidson

W. H. Hayes

DURING the first quarter of the ELECTRIC RAILWAY JOURNAL Maintenance Contest started in November, 1929, a total of 23 maintenance items were submitted. Many properties not having participated in previous contests contributed valuable ideas. All items submitted were carefully considered by the committee of judges consisting of C. A. Smith, superintendent of roadway Georgia Power Company, chairman; G. C. Hecker, general secretary American Electric Railway Association; Dwight L. Smith, electrical engineer Chicago Rapid Transit Company; T. H. Nicholl, research department Cleveland Railway; and John A. Miller, Jr., managing editor of the JOURNAL.

In the department of rolling stock and shops, the prize was awarded to the article "Hood Rims and Carlins Reshaped by Machine," submitted by James Davidson, assistant foreman in the mechanical department of the Cleveland Railway. This machine is unusual in its design and greatly facilitates the forming of hood rims and carlins as described elsewhere in this issue. The prize in the department of way and structures was won by W. H. Hayes, supervisor of welders and grinders of the Georgia Power Company, for his article "Welding and Cutting Equipment Combined." The item tells in detail how an oxyacetylene cutting apparatus and a complete welding outfit were installed on one truck. This arrangement has proved to be of great benefit to the maintenance of way repair men, who are now enabled to do the cutting and welding of rails more quickly.

In the department of buses and garages, the article "Double Air Chuck Inflates Dual Tires Properly" was awarded the prize. This article was submitted by Richard Grant, formerly foreman of the Berea Garage of the Cleveland Railway. A unique method of inflating dual tires devised by the Cleveland Railways is described in this item, which appears elsewhere in this issue. In the electrical and line department only one item was received and for this reason the judges decided to make no award but to consider this article in the second period of the contest,

James Davidson

THE winner of the prize in the department of rolling stock and shops is James Davidson, assistant foreman in the mechanical department of the Cleveland Railways, Cleveland, Ohio. Mr. Davidson was born in 1886, and started to work for the company during September, 1907, as a carpenter in the department of equipment and building. With the exception of one year, when the Cleveland Railway was operated by the Municipal Traction Company, Mr. Davidson has been in the employ of the same company since 1907. He advanced to the position of assistant foreman of the erecting department in 1913, which position he is holding at the present time. Mr. Davidson has always been much interested in the simplification of methods in the shops of his department, and many improvements have resulted from ideas which have been originated by him during his connection with the Cleveland Railways.

Richard Grant

IN THE department of buses and garages the prize winning item was submitted by Richard Grant, foreman of the Berea Garage, Cleveland Railway, and was entitled "Double Air Chuck Inflates Dual Tires Evenly." Mr. Grant died on Feb. 11, 1930, as the result of injuries received in an automobile accident. He was 39 years old and had been in the employ of the Cleveland Railway since August, 1926. He was greatly liked by his fellow workers and his death will be felt very keenly by all those who were in close contact with him in the daily performance of their duties.

W. H. Hayes

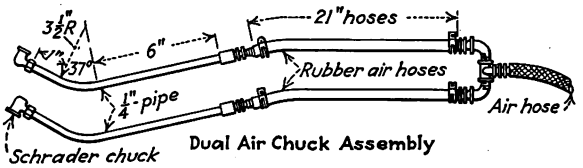
IN THE department of way and structures the prize was awarded for the article "Welding and Cutting Equipment Combined," submitted by W. H. Hayes, assistant roadmaster Georgia Power Company, Atlanta, Ga. Mr. Hayes worked from 1908 to 1918 as bill clerk and rate clerk for the A.&W.P. R.R. at Hogansville and La Grange, Ga. Not being satisfied with this type of work Mr. Hayes decided to take up welding, a practice which gained a great deal of favor during that time. He joined the Navy in 1918, and followed a six months training course, after which he was detailed at the Navy Yard in Norfolk as ship welder, and held this position until 1921. When leaving the Navy Mr. Hayes was employed by the Georgia Power Company as a welder, and after two years was promoted to the position of supervisor of welders and grinders, which he is holding at the present date.

Digitized by Google

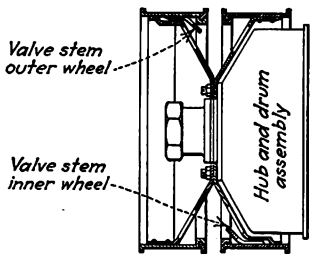
Double Air Chuck Inflates Dual Tires Evenly*

By Richard Grant
Foreman Berea Garage Cleveland Railway

DEVELOPMENT of a double air chuck has greatly facilitated inflation of rear wheel dual tires to the proper pressure on buses of the Cleveland Railway. The single fitting was found unsatisfactory, since it was difficult if not impossible to inflate the inside and outside



Dual Air Chuck Assembly



Wheel Assembly

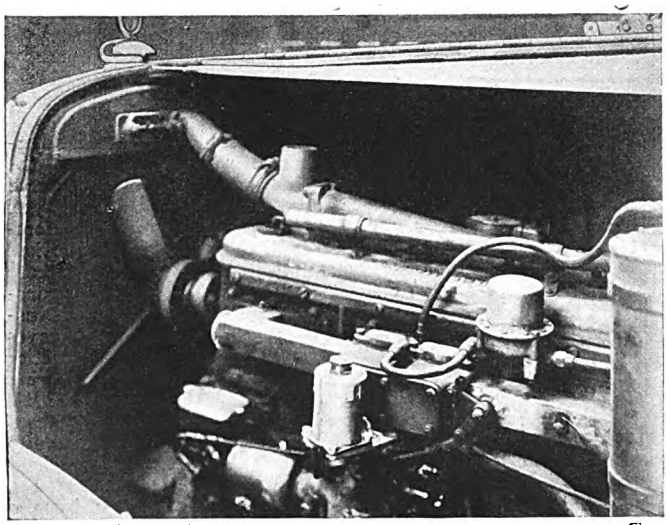
Use of this double air chuck developed by the Cleveland Railway has facilitated inflation of dual tires

tires properly with several sizes in use. Correct inflation is of importance if maximum mileage and minimum road failures are to be attained.

The double air chuck illustrated enables the operator to reach without difficulty the valve stems, regardless of type or angle. Its use has brought about a far better condition of the tires on rear wheels, and has reduced the time for inflation materially, resulting in a saving of labor.

Electric Governor for Buses

HOOKED in the control circuit of the generator which supplies energy to the motors driving the bus, an automatic electric governor built by the General Electric Company according to specifications of the International Bus Company, Buffalo, N. Y., prevents high generator voltage. Excessive speed of the bus is thus avoided, as is also flashover on the motor commutator. The device consists of a solenoid-actuated lever which operates a butterfly valve on the carburetor. All gas-electric buses operated by the International Bus Company have been equipped with this new device.

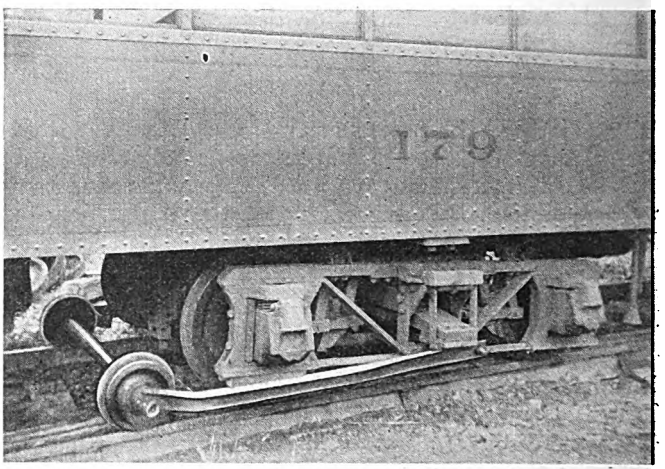


An automatic electric governor is located directly above the carburetor on buses of the International Bus Company, Buffalo, N.Y.

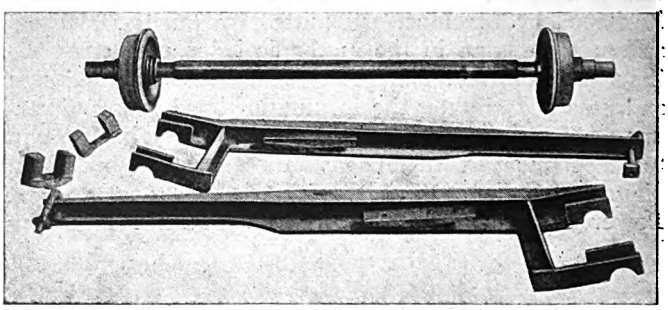
Emergency Dolly for Broken Axles*

By E. J. Jonas
Superintendent of Equipment Cincinnati Street Railway

TRAFFIC delays due to broken axles are reduced to a minimum by means of a dolly designed in the shops of the Cincinnati Street Railway. The device can be harnessed to a broken truck by the repair crew to bring the car in to the shops. The device used has a weight of 445 lb. The center portion of the dolly axle



Dolly used by Cincinnati Street Railway to bring in car with broken axle



When not in use dolly can be taken apart easily and carried on the emergency truck

is of 3-in. steel tubing shrunk on to 2-in. solid ends. The wheels are free to revolve on the axle, and each has an annular groove in a bronze bushing which is filled with lubricant by means of a pressure gun. Two sets of truck frame supporting blocks accommodate the two types of trucks used by the company.

On a paved street two men can install the emergency dolly with ease in a short time. To accomplish this the truck is jacked up and wheels rolled into place. This being done, the end members are then coupled and the car is ready to move. A 2-mile run at normal operating speed over curves and special work has been made with this device without trouble of any kind.

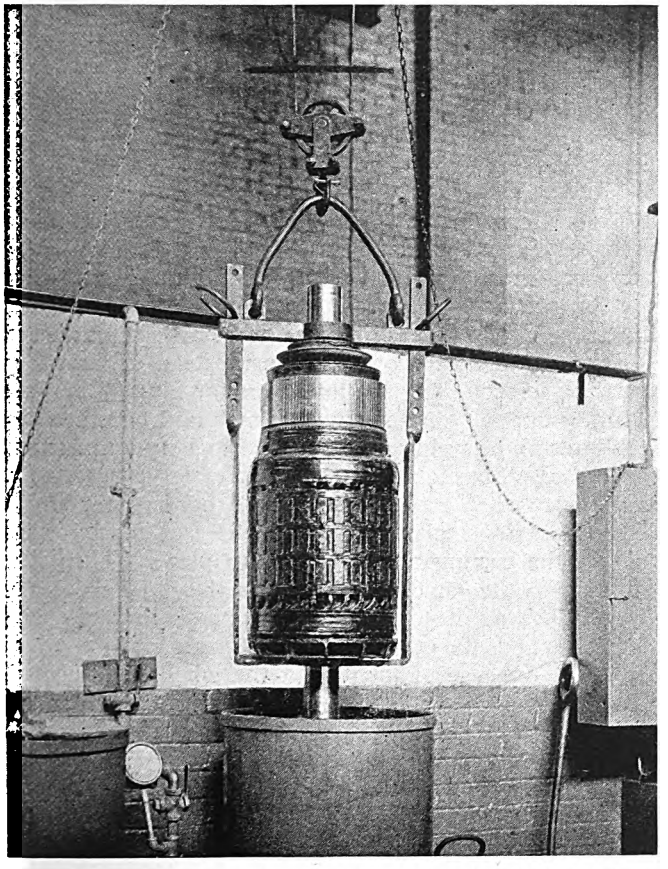
**Submitted in* Electric Railway Journal *Prize Contest.*

Digitized by Google

Safety Holder for Dipping Armatures*

By W. A. Traw
Armature Room Foreman Dallas Railway & Terminal Company

With a new safety yoke of ½x2-in. iron bar designed and used in the shops of the Dallas Railway & Terminal Company an armature prepared for dipping and baking is supported from the bottom and is locked



Holder for armatures designed and used by the Dallas Railway and Terminal Company

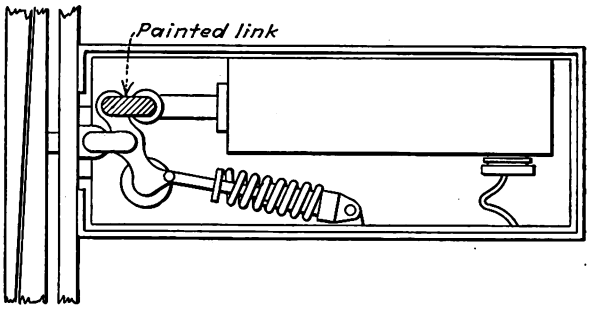
in such a position that it is almost impossible for it to slip out of the holder before being dipped. Formerly on one or two occasions the old-style clamp put on the commutator end of the armature shaft slipped off with an almost disastrous result when an armature fell to the floor, barely missing a workman.

It should be noted that one size yoke will take practically every size and type of railway armature from 25 to 65 hp.

Disconnecting Locked Tongues of Electric Track Switches*

By G. I. Grant
Chief Inspector School of Instruction
Toronto Transportation Commission

Locked tongues due to ice-coated plungers in electrically operated switches make it necessary for operators to disconnect the tongue from the plunger by the removal of a link in the mechanism. Several car derailments have occurred on the lines of the Toronto



When the link to be removed to release a frozen electric track switch was painted a distinctive color derailments were reduced in Toronto

Transportation Commission when the wrong link has been removed and the tongue thereby cut free from its locking spring. In addition to diagrams posted in carhouses and lectures given to new men in the school of instruction, a further aid to operators has been provided by painting the proper links with a distinctive color.

Electrically Heated Inspection Lamps*

By Christ Reinker
General Foreman Mechanical Department
Cleveland Railway

A trouble light that is particularly adapted for use in cold weather has been designed at the Havard shops of the Cleveland Railway for the use of the line department. It consists of a handle, 8 in. long and 2 in. in diameter, with a conical reflector 5 in. long. The wooden handle, drilled with a number of ¼-in. holes, contains a 2,500-ohm resistance, properly insulated, which acts as a heater. The resistance is in series with a 110-volt, 23-watt Mazda lamp located within the reflector. This light is especially advantageous when work must be done to the overhead in tunnels, under bridges, or at night when the weather is cold, as it keeps the hands of the workman warm and permits him to do his best work.

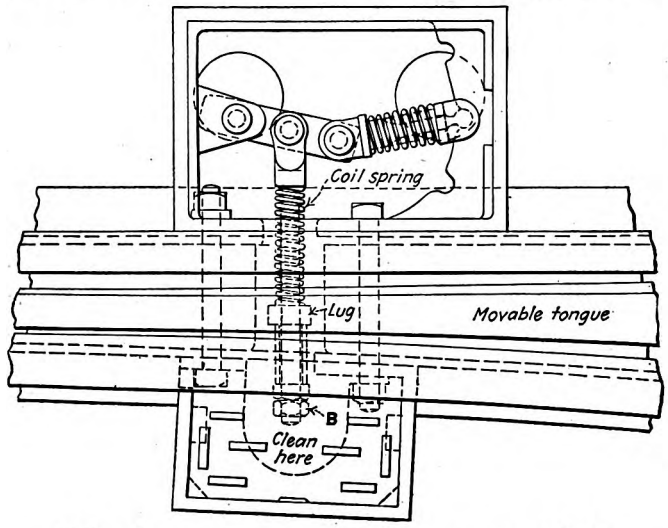
Inspection light used by Cleveland Railway has electrically heated handle

Digitized by Google

Improved Connecting Rod for Tongue Switches*

By E. B. Spenzer
Way Department Cleveland Railway

DECREASED wear on the working parts of lock boxes of track switches has resulted in Cleveland from the use of a coil spring placed on the connecting rod between the tongue and the yoke. This spring is adjusted just under tension and takes up any slack motion due to the wear that occurs, thus reducing the likelihood of having a split switch. The frequency of inspection is materially decreased, which gives the switch crew more time for other work. Construction of this connecting rod is simple and easy. Ordinarily the connecting rods are threaded the entire length to provide for the nuts, which hold and adjust the pipe separators. With the new design this is not necessary, for the entire adjustment is taken care of at the nut *B* at the end of the rod, as shown on the accompanying sketch.



Coil spring on connecting rod reduces wear on switches of the Cleveland Railway

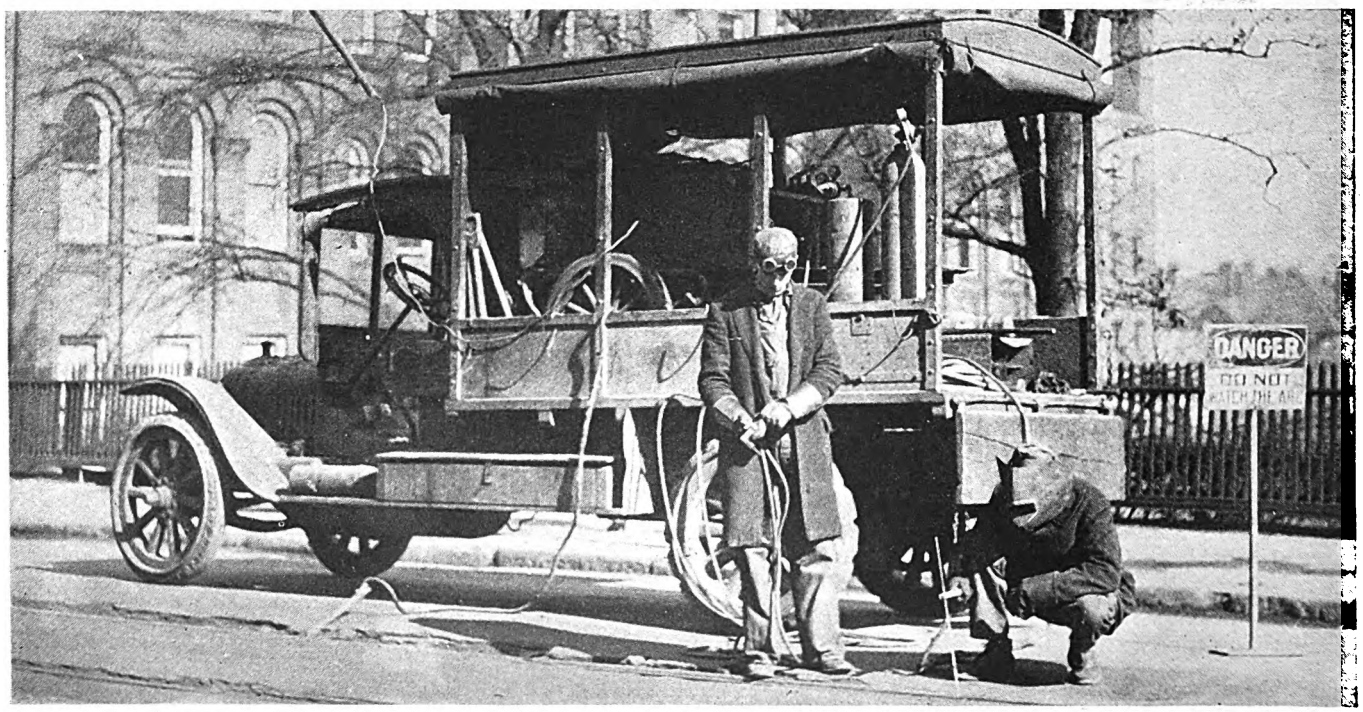
**Submitted in* Electric Railway Journal *Prize Contest.*

Welding and Cutting Equipment Combined*

By W. H. Hayes
Assistant Road Master Georgia Power Company
Atlanta, Ga.

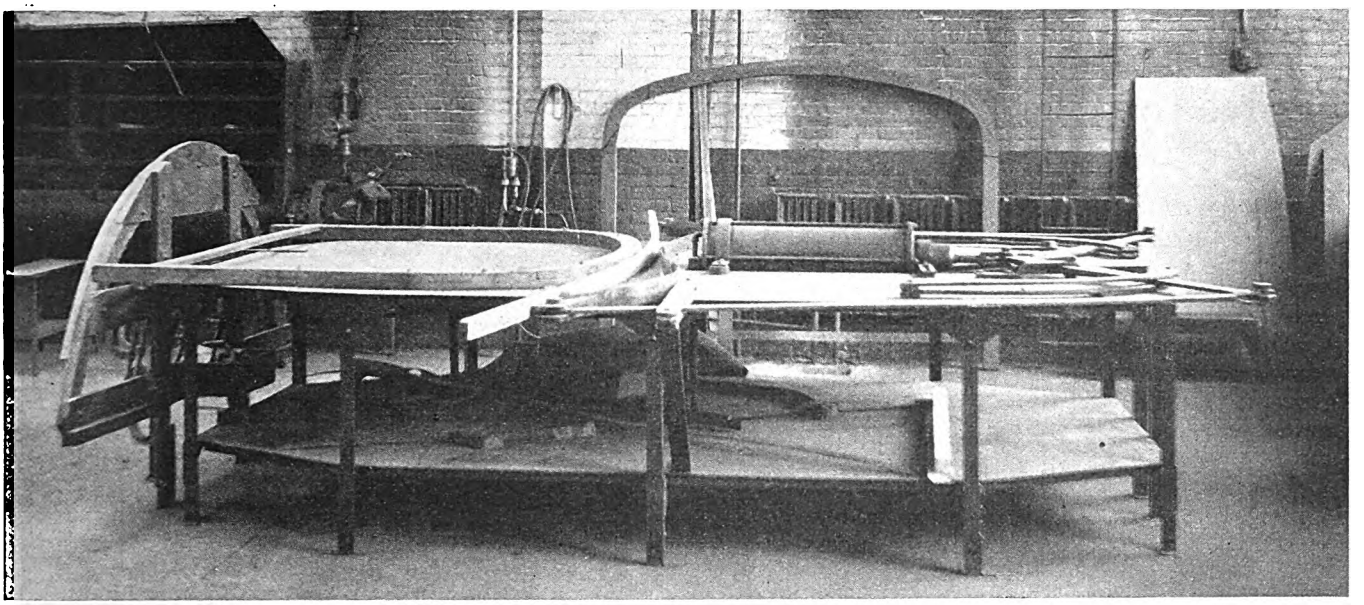
COMPLETE welding and cutting equipment in a single unit, consisting of a Una Type D-4 electric welder and an oxy-acetylene cutting outfit, installed on a 1-ton White truck, has been found very useful by the Georgia Power Company. Two such trucks have been equipped. Considerable time has been saved by having these units together, as the men do not have to wait for the equipment to be moved, especially when jobs located at various places have to be taken care of. In particular, each man can do his own burning instead of having to wait for someone to come and do it for him.

When special work has worn down and become noisy it is built up by welding and ground to a smooth surface. This repair lasts about two years under heavy traffic and longer when traffic is lighter. A hard center broken beyond repair is taken out, and a piece of steel cut and laid in the casting and welded into place. Then it is built up to the same dimensions as the old hard center by welding and ground down to a smooth surface. This lasts as long as the other work in the same location, which saves the expense of taking out the whole frog and replacing it with a new one or installing a new center. If the ball of the rail is broken away from a joint a plate is put on the outside of the rail and welded to the base while it is ground to a smooth surface after cooling.



A complete electric welding set and an oxy-acetylene cutting equipment are mounted together on a 1-ton White truck by the Georgia Power Company

Digitized by Google



This machine in the Cleveland Railway shops is used to shape hood rims or carlins

Hood Rims and Carlins Reshaped by Machine*

By James Davidson
Assistant Foreman Mechanical Department
Cleveland Railway

FORMING hood rims and carlins in the shops of the Cleveland Railway has been expedited by the development of a machine for forming these parts. This replaces the old method of shaping by hand with clamps.

The machine consists essentially of a table with the form for a hood rim or carlin placed on it and a flexible steel band attached to a pneumatic cylinder. A cylindrical steam chest is conveniently located to steam the wood. The strip to be bent is placed in position; then the air is admitted to the cylinder, and by means of levers the steel bands shove the board to the required position of the hood or carlin. After the piece is shaped it is placed on a form and slats are nailed in position.

Reclaimed Crank Case Oil for Curves and Switches

By Louis T. Botto
Superintendent Maintenance of Way
San Antonio Public Service Company

AFTER considerable experimentation the maintenance of way department of the San Antonio Public Service Company has adopted the practice of using oil drained from automobile crank cases for oiling the curves and switches over its system. This oil has a very high lubricating value and is much more satisfactory than the crude oil formerly used. Its use has resulted in a saving of $30 per month.

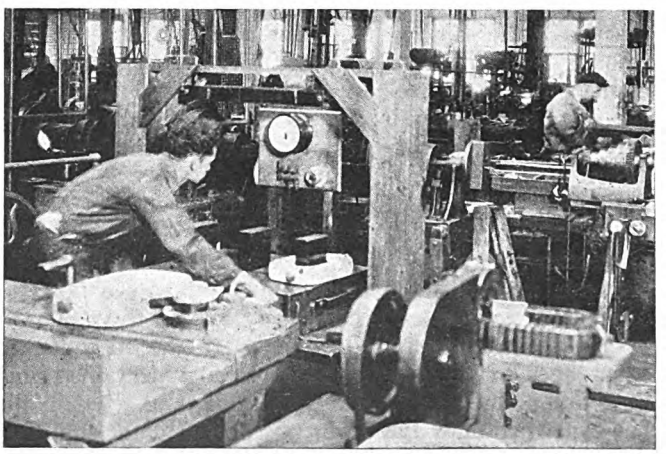
Corrections

In the article "Spray Equipment Effective for Weed Killing" appearing on pages 104-105 of the February issue of this paper, it was stated that a speed of 40 m.p.h. is required to discharge 472 gal. per mile of track. The figure 40 m.p.h. is a typographical error and should read 14 m.p.h.

On page 108 of the same issue, in the article "Combination Tie Plate for Various Rails," the phrase "tie plates in various sizes" should read "a combination tie plate" to fit the different rail widths.

Field Testing and Taping

TESTING field coils is considered of sufficient importance in the Cold Spring shop of the International Railway, Buffalo, N. Y., to have an especially designed testing outfit for this purpose. All coils are checked at some time between their final taping and their dipping. A first test is usually made when the coils come out of the motor; the second test after the coil is repaired and the third test after the coil has been dipped. A Peerless Equipment taping machine saves the labor of three men at 50 cents per hour, with a resultant saving of something like $4,050 a year on the basis of a 54-hour week. The $300, which represents the cost of the taping machine, is paid for a dozen times over, as a consequence.



Field coil testing device and taping machine used in Cold Springs shop of the International Railway, Buffalo, N. Y.

Digitized by Google

Advantages of Single-Motor Drive for Gas-Electric Buses

By C. A. Atwell
Design Engineer
Westinghouse Electric & Manufacturing Company

GAS-ELECTRIC buses of recent design use either one, two or four driving motors. There are certain fundamentals in the design of a single motor of large capacity, however, which give it advantages over two or more motors of equivalent total capacity. These advantages are: less weight; less cost; more rugged construction; higher efficiency; less inspection and maintenance required and the use of simpler control and wiring allowed.

The decreased weight of one motor as compared to two or more motors of equivalent capacity is due to the requirement of less total active copper and iron to produce the same result, and also to the fact that the weight of the mechanical parts of the single motor is less than the total for the smaller motors. The net result is that the single motor weight is 15 to 20 per cent less than the weight of two motors which do the same service, and this percentage will be increased in a comparison of the single motor with four motors capable of performing the same service.

The manufacturing cost of the single motor is less, not only because of less total material used, but also because of the reduced number of manufacturing operations. It is easy to see that it will not take as much labor to wind one armature as it does to wind two smaller ones of approximately half the size.

Better mechanical construction can be obtained in the single motor because of the relatively larger parts throughout. This applies especially to the electrical windings. A single motor, for example, uses a single-turn armature coil while the usual motor for a dual drive equipment uses a two-turn armature coil. It is generally true that electrical apparatus of larger rating has higher efficiency. Comparison of existing single-drive and dual-drive bus motors shows the single motor to have between 2 and 4 per cent higher efficiency over the operating range. The point of maximum efficiency for the single motor is around 92 per cent, and for the dual-drive motor, 89 per cent.

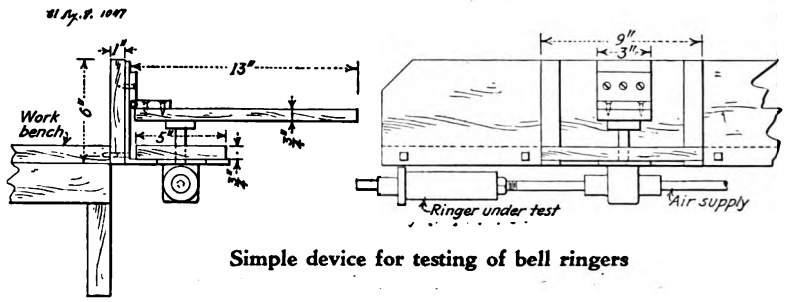
Inspection and maintenance for a small motor require practically the same work as for a larger one; thus the amount of this item will be practically proportional to the number of motors. The bus wiring is simplified by the use of a single-drive motor as it is necessary to carry only one set of power cables from the controller to the motor.

In general, it appears that the disadvantages of the single motor drive are: lack of the "motor series" connection; 1 to 1½ in. increase in bus floor height or decrease in ground clearance; inability to obtain independent traction on each driven wheel.

Opposed to these disadvantages are the six inherent advantages of the single motor already mentioned and, in addition, the weight and cost savings effected in the bus construction by the fewer number of motor supports, driving gears, propeller shafts and universal joints or couplings. Evaluation of these advantages and disadvantages for a gas-electric bus of given size and weight to operate in a certain service should give a rather definite indication as to whether the single-motor drive should or should not be used.

Hand Lever for Testing Pneumatic Bell Ringers

TESTING pneumatic bell ringers is done by means of a simple and convenient device in the shop of the Richmond Railways, Staten Island, N. Y. This outfit was designed and constructed by Equipment Inspector Nicksie. A 1-in. x 6-in. plank is bolted to the end of the work bench. A standard foot valve and pin are mounted on a ¾-in. x 5-in. x 9-in. plank which is supported by two 1¼-in. x 1-in. hangers fastened to the work bench plank. One side of this foot valve is connected to the air supply and the other side is supplied with a long nipple threaded on both ends.



Simple device for testing of bell ringers

The ringer to be tested is screwed on the end of this pipe. A tapered wooden handle, 13 in. long, ¾ in. thick, 3 in. wide on one end and 1 in. wide on the other, is hinged and fastened to the bench plank directly over the center of the valve plunger. Pressing down on this handle compresses the valve plunger, admitting air to the ringer under test.

Proper Fit of Brushes Reduces Chatter

By W. E. Warner
Brentford, England

APART from mechanical vibration of the motor, brushes chatter from two causes, an uneven commutator surface or a bad fit of the brushes in their holders. If the micas stand above the segments the brushes are sure to vibrate, and sometimes with recessed micas vibration occurs also. This is caused by the sharp edges of the segments and can be prevented by filing a very slight bevel on the edges so as to present a rounded edge to the brush. It is desirable to sand the commutator after the micas have been recessed. If the brushes are badly fitted in their holders they will vibrate, although a certain amount of clearance is necessary to permit the free movement of the brush, which, however, should not be excessive. A well-fitted brush should slide freely up and down, although motion backward or forward is undesirable. When brushes do not fit properly and others cannot be procured, a practical remedy is to dust the edges of the brush and the inside of the holder with powdered flake graphite. This graphite will take up the clearance between the brush and the holder and take up the play, and not prevent free movement of the brushes.

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Akron, Ohio—Approximately $400,000 will be spent in Akron during 1930 by the Northern Ohio Power & Light Company looking toward a betterment of the railway lines and the improvement of car service.

✦

New York, N. Y.—The Interborough Rapid Transit Company is to install a turnstile at the Grand Central Terminal station with a new type of gears, designed to eliminate noise. If successful the device will be placed on all turnstiles.

✦

Louisville, Ky.—In police court, on Feb. 18, Robert Falls, seventeen years of age, was fined $10 for hooking a ride on the back of a car of the Louisville Railway. Neil W. Funk prosecuted the case as head of the claim department of the railway. He cited numerous instances of boys and other persons who hang to street cars, and asked that an example be set in this case.

✦

Albany, N. Y.—The New York State Automobile Association went on record on Feb. 25 opposing any increase in the motor fuel tax this year.

✦

Indianapolis, Ind.—The Public Service Commission has approved a petition of the Peoples Motor Coach Company and the Pennsylvania Railroad to establish a new bus line between the Union Station in Indianapolis and the Hawthorne freight yards. The English Avenue route will be abolished as soon as the new line direct to the downtown district is started. The Peoples Motor Coach Company is owned by the Indianapolis Street Railway.

✦

San Francisco, Cal.—The Key System Transit Company announced that deposits as of Feb. 14 indicate payments under subscription for new preferred stock of $3,995,825 against required amount of $3,500,000.

✦

St. Louis, Mo.—The aldermanic committee on streets and sewers has approved a proposed ordinance for the widening of Broadway between Morrin Avenue and Switzer Avenue. The Broadway tracks of the St. Louis Public Service Company are to remain on the west side of the street. Alderman Kuhs informed the committee that neighborhood opposition to the tracks on the west side had been withdrawn. The railway said it would substitute buses for the street cars north of Taylor Avenue should it be required to undertake the costly work of placing the car tracks in the center of the widened street.

✦

Washington, D. C.—The Federal Trade Commission resumed on Feb. 24 its hearing in connection with the financial phase of the public utilities.

(*Late News Continued on Page* 00)

Fares to Be Increased by Detroit Municipal Railway

New Cars, New Buses and Trackless Trolleys Included in Program for Modernizing System—$3,000,000 Increase in Gross Expected

A FLAT rate of 8 cents for both street car and bus fares with no charge for transfer has been voted by the Detroit Street Railway Commission to go into effect on March 15. The new rate is an increase of 2 cents for cash fares on the cars and a decrease of 2 cents in bus fares. It was passed by a vote of two to one, Commissioner Frank Couzens dissenting. The increase has been approved by Mayor Bowles. The fares charged on the department's de luxe buses will remain unchanged.

The new plan calls for selling four tickets for 30 cents or ten for 75 cents for use on either street cars or buses. The present rate on street cars is 6 cents cash fare or nine tickets for 50 cents. One cent is charged for transfer on street cars. No tickets are now sold on the buses, the cash fare being 10 cents with free transfer. Children will be allowed to ride on cars and buses for 6 cents.

Price, Waterhouse & Company, public accountants, estimate that on the basis of the relative number of cash and ticket riders carried on the system in 1929, and after making allowance for a possible shift in the trend of traffic from cars to buses, it would appear that the suggested fare adjustments should produce in 1930 $3,000,000 more in gross revenue than was produced in 1929, provided there is no decrease in the number of passengers carried.

General Manager Smith stated that the additional revenue derived from the increased fares will permit the department to expand its express service on several main arteries and will enable it to add approximately 200 units of rolling stock to present equipment this year. It is planned to retire entirely this year all of the department's single-truck cars and to add a number of buses to the present service, establish new routes, etc. Many substantial improvements will be made at once, but the full program of modernization is not expected to be completed for two years.

Mr. Smith said that within 30 days he can have all of the present rolling stock in good shape and can place 150 cars, now in the yards, back in service before March 15. The percentage of crippled cars is higher now than usual because shop forces were decreased due to losses in revenue during December and January. An endeavor was made to keep operating expenses commensurate with income.

In replying to the Mayor Mr. Smith said he was sure the 8-cent fare need not be continued in force longer than eighteen months or two years, because at the end of 1931 the department will have finished paying off its D.U.R. debt (approximately $9,000,000), and other carrying charges

(*Continued on Page* 167)

COMING MEETINGS

March 11—Twelfth Annual Convention—Oklahoma Utilities Association, New Tulsa Hotel, Tulsa, Okla.

March 19-20—Illinois State Electrical Association, Illinois Gas Association, Illinois Electric Railway Association—Hotel Abraham Lincoln, Springfield, Ill.

March 28—Annual Meeting—Maryland Utilities Association, Willard Hotel, Washington, D. C.

April 9-10—Central Electric Railway Master Mechanics Association, Mansfield, Ohio.

April 29-May 1—United States Chamber of Commerce, Washington, D. C.

May 14-15—Association of Electric Railway Equipment Men, Middle Atlantic States, Scranton, Pa.

June 23-26—American Electric Railway Association, 49th annual convention, San Francisco, Cal.

July 23-25—Electric Railway Association of Equipment Men, Southern Properties, Nashville, Tenn.

Scope of Brady Awards Broadened

A new basis has been announced by the American Museum of Safety for the Anthony N. Brady Memorial Medals for 1929. Instead of requiring the presentation of a formal brief the contest will be judged upon the comparative showing of the electric railways in the various classifications as set forth in their accident statements submitted on the forms provided for the purpose to the American Electric Railway Association.

The committee on award will take into consideration also any supplementary statement or information bearing upon accident prevention or safety work received prior to the closing date, April 1, 1930. The winners will be announced at the A.E.R.A. convention in San Francisco in June. Under the conditions all electric railways which file the stipulated statements will be afforded an equal opportunity in their respective classes.

Digitized by Google

LATE NEWS

(*Continued from Page* 165)

Boston, Mass.—Postponement for two weeks has been ordered on hearing of the bill which would authorize the Eastern Massachusetts Street Railway to acquire the securities of the Boston & Revere Electric Street Railway, Winnisimmet Railroad, Boston & Chelsea Railroad and East Middlesex Street Railway.

✦

Denver, Col.—The Denver Tramway Company has placed two more bus routes in service and abandoned the railway route operated from the Union Station far out into the Park-Hill district. The bus lines connect in the outlying residential district with other railway lines which start from the Union Station. This eliminates duplicate transportation throughout the business section of the city.

✦

Springfield, Ill.—Realizing the possible need of future electrification, the Chicago & Illinois Midland proposes to purchase the Chicago, Springfield & St. Louis line from Springfield to Lock Haven, Ill., on condition that it can acquire a 200-ft. right-of-way in open stretches and 100-ft. around towns. With this same idea in mind, the Midland has acquired a 200-ft. right-of-way from Springfield to Peoria.

✦

Los Angeles, Cal.—A petition has been filed with the Los Angeles Council to require the Los Angeles Railway to extend its West Adams Street line to Culver City. The same petition asks that the lines of the company be extended to Moynier Lane.

✦

Ithaca, N. Y. — The Public Service Commission has authorized the Ithaca Railway, Inc., to exercise a franchise from the city for the operation of its trolley line in that city. On Dec. 5 last the commission denied a like application because the company had not applied to and received approval from the commission for the reorganization of the Ithaca trolley line. The reorganization was approved on Jan. 23 last.

✦

Richmond, Va.—An investigation into a revision of rates in the interest of increasing travel on the line will be undertaken by the Richmond-Ashland Electric Railway. President Zimmer reports that traffic has improved in recent months and that it now appeared that the company would be able to met the interest on its bonds in July. Because of the extraordinary expense connected with repairs and a loss of traffic while this work was under way, the company defaulted its interest payment on Jan. 1. To bring about a closer relationship between the company and people living in the territory served by the line, J. A. Schermerhorn and J. R. C. Brown have been added to the board.

✦

Boston, Mass.—Differences of opinion between the city and the Boston Elevated Railway over the question of financing a subway under Governor Square appeared just as pronounced as ever before the legislative committee on metropolitan affairs at the recent hearing, but Henry I. Harriman, chairman of the Elevated board of trustees, suggested that the committee appoint a sub-committee to meet with the trustees and the Mayor with a view to bringing about an agreement so that legislation could be passed at the present session. The burden of Mr. Harriman's argument has been that the Elevated road could not meet the entire cost of rental, which is $135,000 a year on the $3,000,000 relief project.

✦

New York, N. Y.—The Pennsylvania Railroad's proposal to establish bus transfer service at Newark and New York has been assigned by the Interstate Commerce Commission for hearing on March 26. The commission previously had suspended operation of the tariff filed by the Pennsylvania to meet the competition of the Baltimore & Ohio. The commission has not formally announced whether the investigation incident to the Pennsylvania's tariff will also include the Baltimore & Ohio's practice, inaugurated several years ago without authorization from the commission, but it is probable that the legal status of the Baltimore & Ohio's policy will be brought into the issue at the hearing.

✦

Kansas City, Mo.—The limited-stop plan of street car operation will be applied to several more lines by the Kansas City Public Service Company. Streets on which lines involved in the change now operate have been made safety stops for intersecting vehicular traffic. An actual check on lines to which the skip-stop plan has been applied shows a saving in time of from 18 to 25 per cent. Under the plan, stops usually are made at every other block on north and south streets, and every third block on east and west streets. The plan aims at passenger stops from 1,100 to 1,200 ft. apart.

✦

Youngstown, Ohio—The Youngstown Municipal Railway has asked permission of the state Public Utilities Commission to buy the Park & Falls electric line, 3.8 miles long, for $575,333, to be paid for with a 7 per cent promissory note. The West End Company has asked authority to buy the Youngstown-Sharon interurban line, 13.6 miles in length, for $2,133,978, to be paid for by a 6 per cent promissory note.

✦

Fishkill, N. Y.—The Fishkill Electric Railway has applied to the Public Service Commission for permission to substitute buses for street cars in Fishkill. The municipal authorities have consented to the substitution. It is proposed to operate buses along the Beacon-Fishkill road from the Beacon city line through Fishkill township and village to the eastern terminus of the present trolley line.

✦

Louisville, Ky.—A plan to sell two power plants and all substations of the Louisville Railway to the H. M. Byllesby Management & Engineering Company for $3,000,000 and an underwriting of $3,000,000 in refunding bonds by a local syndicate have been suggested as a means for the refinancing of $6,000,000 in first mortgage 6 per cent bonds due on July 1, 1930. The proposal for the sale of the power plants is not a new one, but the prospects for the consummation of the deal would appear to be good, particularly since it is understood that rates for purchased power as recently suggested come closer to meeting the ideas of the railway management than any that have heretofore been suggested.

✦

Cascadia, Wash.—The Oregon Electric Railway's project to build a line from Albany to Cascadia, Wash., 40 miles, has been modified to provide for joint use of the Southern Pacific's line between Albany and Lebanon. The rest of the project, which includes three branch lines, will be carried out as originally planned in the application submitted to the Interstate Commerce Commission by the Linn County Logging & Lumber Railway. The application has been amended accordingly and the Southern Pacific has withdrawn its opposition to construction of the line, which will tap extensive timber lands on the west slope of the Carcade mountains.

✦

St. Louis, Mo.—Bids are being taken on the concrete substructure for the Illinois Terminal Railroad's new elevated line in St. Louis to connect the McKinley Bridge with the proposed subway under Twelfth Street between Cass Avenue and the new freight and passenger terminal at Twelfth Street and Lucas Avenue. President Fischer, of Illinois Terminal, says the steel for the superstructure is being fabricated. Excavating for the 3,000-ft. subway portion will be started as soon as the elevated line has been installed and the city has completed condemnation of property needed to widen High Street to a 100-ft. boulevard. Two tracks will be installed in the subway, but it is designed to care for six tracks eventually.

✦

Ottawa, Ont.—Red Line, Ltd., has appealed to the Second Divisional Court at Toronto against a judgment of Magistrate Hopewell of Ottawa who fined it $10 and costs for unlawfully competing with the Ottawa Electric Railway within the city limits in carrying passengers. Appellant operates a sightseeing bus from the Chateau Laurier under agreement with the hotel, charging $1 per head. The Ottawa Electric Railway also operates a sightseeing bus line along the same route.

✦

New York, N. Y. — Stockholders of the Commonwealth & Southern Corporation, Allied Power & Light Corporation and Penn-Ohio Edison Company approved on Feb. 10 a plan of merger and consolidation of the Commonwealth & Southern Corporation, Allied Power & Light Corporation, Commonwealth Power Corporation, Penn-Ohio Edison Company and Southeastern Power & Light Company, and specifically approved the agreement of merger and consolidation of the three companies incorporated in Delaware, namely: the Commonwealth & Southern Corporation, Allied Power & Light Corporation and Penn-Ohio Edison Company, thus completing the first and most important step in the simplification of the corporate structure of the Commonwealth & Southern System. Stockholders of the Maine corporations, namely, Commonwealth Power Corporation and Southeastern Power & Light Company, over 96 per cent of the common stock of which is already owned by the Commonwealth & Southern Corporation, will meet later.

Digitized by Google

Progress Reported on Washington Merger Legislation

After having decided to separate the section pertaining to court appeals from the resolution permitting the Washington railways to merge, the Senate District committee has announced that action on the merger proposal will be deferred until disposition has been made of the court section. Under the present arrangement, the section formerly attached to the merger agreement, which limits the right of utility companies to appeal to the courts in rate cases, will be handled as an amendment to the utility act. It is contended by the utility commission that under the present law the companies can submit matters of fact as well as matters of law to the courts.

Meanwhile, practically every section of the bill has been agreed upon by the committee. There is some dispute, however, over the rates of fare for school children. Although the amendment relating to court appeals on rate cases will be reported out first, both of the bills will be placed together on the Senate calendar.

Under the terms of the merger bill, the lines of the Westinghouse Railway & Electric Company and the Capital Tráction Company will be consolidated as the Capital Transit Company. The bus properties of the Washington Rapid Transit Company also will be acquired by the new organization. It is also provided that the rates of fare in effect on Aug. 1, 1929, shall remain unchanged for a period of two years after the consummation of the merger. The companies are relieved of their present burden of paying the expenses of traffic policemen at street railway crossings and intersections. In addition, instead of being compelled to pay the entire cost of maintaining the paving between the rails and for 2 ft. outside of the outer rail, the new company will only have to pay one-fourth of this expense.

New Franchise Proposed for Rochester

The New York State Railways, Rochester Lines, now in receivership, and the city of Rochester have reached an agreement whereby the service-at-cost contract, controlling railway operations, may be continued to Aug. 1. Meanwhile a new contract will be drafted to supplant the present one, voided automatically with the receivership.

The railway acceded to demands of the Council that a 5-cent fare be established for school children and that tickets be sold on electric cars and buses at a rate of six for 50 cents or twelve for $1. The straight fare is 10 cents.

Changes in New York Utility Regulation Recommended

Two reports have emanated from the commission on revision of New York state utility laws. Of these reports, that prepared by Colonel Donovan, counsel to the commission, proposes a revision of the New York statutes which would recognize the established law of the land regarding valuation. He recommends further that the Public Service Commission be given the legal powers and facilities it needs to effect real regulation, based upon adequate research of its own and including supervision of utility accounting and finance. These provisions he would supplement by a declaration of legislative policy favoring voluntary agreements between the commission and the service companies for rate regulation through accounting control, in the hope of reducing the great volume of protracted and unsatisfactory litigation over rates.

Professor Bonbright and Frank P. Walsh, two of Governor Roosevelt's three appointees, declare for enactment of the "prudent investment" theory of valuation. They embrace the idea of duplication of gas and electric plants and distributing systems by municipalities, if only as a means of compelling the companies to "help rather than hinder regulation in order to retain the private ownership method," and favor creating a so-called people's counsel. Continuation of the existing situation, say the Governor's appointees, will inevitably present government ownership in some form as the only solution, but they hasten to add that "we do not feel that public opinion is yet ready for that alternative."

Arrange Your A.E.R.A. San Francisco Itinerary Now!

American Electric Railway Association headquarters has just mailed to all members a handsomely illustrated brochure covering the three special trains for the San Francisco convention—a red, a white, and a blue. The first two trains provide for travel through some of the most picturesque points in the country. The blue special is a fast train for those whose time is limited. All prospective passengers must determine their return routing when tickets are purchased for the going trip in order to take advantage of the special round-trip summer tourist rates. Return tickets are good until Oct. 31. Intending passengers are asked to consult their local railroad ticket agents. A special railroad travel expert will also be glad to discuss plans for the entire trip, make up a definite itinerary and procure accommodations. No charge is made for this service.

June is a month of particularly heavy travel, and in order to secure the newest and most up-to-date equipment the committee should know well in advance the number of persons for whom accommodations are to be arranged on each train. The letter and the confirmation blank enclosed with each booklet contain instructions as to how to arrange for the trip.

A.E.R.A. delegates are October minded so far as the American Electric Railway Association convention is concerned. The convention this year takes place in June, three months earlier than usual.

The hotel committee has issued a circular giving hotel rates and instructions about securing accommodations in San Francisco. Delegates should communicate with Chairman Heise at the address shown in the hotel folder. For the convenience of those who intend to visit Los Angeles for the special two-day program to follow the convention, the committee will have a representative at the registration desk in San Francisco. A stopover for a day at Portland, where they will be entertained locally, is planned for the white special enroute to San Francisco. As in the past, railroad and Pullman representatives will have a headquarters at the registration desk to validate tickets.

The West Coast entertainment committee will shortly announce its program for the entertainment of delegates.

It is fifteen years since A.E.R.A. delegates and their ladies have had an opportunity to visit California for a convention.

Get Set for San Francisco

PRESIDENT SHOUP extends a most cordial invitation to come to California next June. The West Coast committees under W. V. Hill, manager of the California Electric Railway Association, as general chairman, are sparing no pains to help make this one of the most memorable of association conventions. The officers and the executive committee are enthusiastic and hope for a large delegation. They join with President Shoup in extending a cordial and hearty welcome to all delegates, their families and guests.

Detroit Fares to Be Increased

(*Continued from Page* 165)

will also be much reduced by reason of the added revenue. The last installment on the D.U.R. purchase debt is due Dec. 31, 1931. The clearing up of this obligation will release more than $2,000,000 annually to the department.

On Feb. 19 Mr. Smith announced that the purchase of 150 new street cars, 125 motor coaches, installation of express railway service on Fort Street and Michigan and Hamilton Avenues, and rebuilding of tracks on several lines, will be among the first improvements undertaken by the Department of Street Railways, under the fare increase. In addition, the first installation of trackless trolleys will be effected at an early date on Plymouth road.

The new trackless trolley line is to be about 3½ miles long. The new cars will be of the Peter Witt type, and the majority of the new coaches will be of the single-deck street car type.

Auditor Morgan says that despite the increase in fares the department, if it insists upon purchasing 125 new cars and 125 motor coaches, may find itself in debt again. He said:

"I can not say whether we will actually be in debt until the budget has been made up and careful estimates prepared. In the D. S. R. budget there is an item of $2,530,000 for 100 street cars and 75 motor coaches. The department has wanted this additional equipment for a year but I opposed it because the money was lacking. If the funds are not in sight in the future, I will continue to oppose the purchase of this equipment."

According to Mr. Morgan the fare increase is necessary to take care of past accruing deferred maintenance and to set up a depreciation reserve with which to meet future replacements of worn-out equipment.

The D. S. R. is including $7,000,000 in bonds in its new budget. This, Mr. Morgan said, is to take care of "past neglected maintenance" and to take up $3,000,000 in short time obligations which are now on a 6 per cent interest basis. The new bonds will reduce this charge to 4½ per cent.

Digitized by Google

South Bend System Reorganized

New Company Formed to Take Over Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway

WITH the approval of the federal courts on Feb. 11, one of the final steps was taken in lifting the receivership of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway. A new company known as the Northern Indiana Railway, Inc., will take over the assets of both the former companies. It is believed that under the new capital plan it will be possible to rehabilitate the properties, add new rolling stock, and extend the lines to take care of the expanding requirements for transportation of the communities the company serves.

Faced with continued losses in riding due to competition from the private automobile, the Chicago, South Bend & Northern Indiana Railway was forced into receivership in July, 1927. In December of the same year its affiliated property, the Southern Michigan Railway, also went into receivership. In both cases R. R. Smith, vice-president and general manager of the companies, was named receiver by the federal courts. Attempts made previously to effect voluntary reorganization were found to be impractical. It was believed, however, that a plan of reorganization could be formulated which would provide a financial set-up making it possible to continue operations on a basis where capital and credit could be attracted and the properties rehabilitated.

Old Financial Set Up Unwieldy

Under the financial set-up prior to the receivership there were three underlying mortgages in addition to the Chicago, South Bend & Northern Indiana Railway mortgage. Of these three prior liens, the first underlier, the Indiana Railway first mortgage, with principal maturing on Jan. 1, 1930, has paid interest regularly. The properties were, therefore, sold subject to this mortgage, which is being extended for six years during which a sinking fund will retire the bonds. The old funded debt was as follows:

Indiana Railway first mortgage 5's, $426,000.

Northern Indiana Railway first consolidated mortgage 5's, $558,000.

LaPorte & Michigan Traction Company first mortgage 5's, $312,000.

Chicago, South Bend & Northern Indiana Railway first mortgage 5's, $3,089,000.

Funded debt on the property of the Chicago, South Bend & Northern Indiana Railway totaled $4,415,000. In addition there were $2,500,000 in 5 per cent noncumulative preferred stock and $5,000,000 in common stock.

Funded debt of the old Southern Michigan Railway was as follows:

South Bend & Southern Michigan Railway first mortgage 5's, $536,000.

Southern Michigan Railway first consolidated 5's, $395,000.

This made a total of $931,000 in bonds.

Up to Jan. 1, 1930, the funded debt of the Chicago, South Bend & Northern Indiana Railway was $598,350 in arrears on interest. This accrued interest is being so adjusted in the reorganization that with the bonds on both properties the total funded indebtedness amounts to $5,944,350.

Under the new set up, the Northern Indiana Railway, Inc., will have the following capitalization:

Indiana Railway first mortgage 6's, $426,000.

Northern Indiana Railway first mortgage 5's, $1,533,085.

No par common stock to the amount of 100,000 shares.

This compares with the old capitalization of $5,944,350 in bonds and $5,000,000 in common and $2,500,000 in preferred stock.

After six years, when the $426,000 in Indiana Railway bonds has been paid off through the sinking fund, the funded debt of the new company will be $1,533,085.

The newly organized Northern Indiana Railway, Inc., will control and operate the railway and bus lines in South Bend, Mishawaka, Elkhart and Michigan City and the interurban lines connecting South Bend, Elkhart and Goshen; South Bend, LaPorte and Michigan City, and South Bend, Niles and St. Joseph.

The local lines in South Bend and Mishawaka, cities which adjoin and have a population of 135,000 people, operate on thirteen different routes. They serve the Studebaker Corporation, the Oliver Farm Equipment Company, Bendix Aviation Company, Mishawaka Rubber & Woolen Mills and a large number of other manufacturing industries. Operation in South Bend covers approximately 49 miles of track and the bus lines operate over 16 miles of streets.

The city street car fare is 7 cents cash, four tokens for 25 cents. The bus fare is 10 cents cash or three tokens for a quarter. An additional charge of 2 cents is made on transfers issued from street cars to buses.

In Elkhart, with approximately 35,000 people, the cars operate over approximately 14 miles of track. In addition a bus line covers a section of Elkhart not served by rail. Here also transfers are issued between cars and buses.

In Michigan City, with 30,000 people, the cars operate over 7 miles of track, serving the Pullman Car Company, the Sullivan Machine Company and other industries.

The interurban lines operate in three directions from South Bend. They serve a thickly populated district from which many passengers commute to the cities through which these lines pass. Freight is moved over these lines. On the line east of South Bend, connections are made with electric lines serving the Central Electric Railway territory with freight service, direct connection by electric lines being afforded to the Ohio River at Louisville and Cincinnati, with through tariffs with steam roads operating in the southern territory.

The interurban line north of South Bend connects with the Michigan Central Railway south of St. Joseph, Mich., and through tariffs are afforded from points on this division to all steam roads in the Central Freight Association territory.

Plans Additions to Track and Rolling Stock

Arrangements have been made to issue treasury bonds to finance additions and extensions required by the growth of South Bend and other communities served. Funds also will be obtained to rehabilitate the present rolling stock and to purchase ten new interurban and ten city cars under the car trust equipment method.

Planning Wisely for Cleveland's Future

ONE virtue of the Cleveland Railway's plan to embrace the whole county in a single transportation system is that it will encourage Cuyahogans outside the parent city to think in terms of metropolitan development. The transportation future of this community is bound to the policies of the Cleveland Railway to a degree sometimes not understood. Reports submitted to the railway indicate that good service is considered by passengers more important than low fare. It is illustrated in the case of the 25-cent express bus line now serving a small area of the Heights. Speed and comfort outweigh in importance the amount asked at the fare box. If the company can deliver passengers downtown—where most of them want to come—quickly and in comfort at a reasonable rate of fare it will find its chief difficulty surmounted. The county should think in terms of metropolitan living.—*Cleveland Plain Dealer.*

"Jim" Barnes Complimented by Louisville Employees

On the occasion of his tenth anniversary as president of the Louisville Railway on Feb. 11, James P. Barnes was the guest at a banquet in his honor. Five hundred members of the Louisville Railway family gave their chief a rousing ovation. Neill Funk, claim agent of the company, acted as toastmaster. He paid high tribute to Mr. Barnes as an organizer and executive, hailing him as "one of the finest men who has ever been connected with a transportation company in America."

After representatives of various departments had paid individual tribute to their chief, Mr. Barnes spoke briefly but feelingly. He told the employees that everything that had been accomplished had been due to their efforts; that his direction had been only incidental. He recalled that the company had won the Brady Award for safety several years ago and had twice received honorable mention in that contest. He said that the day-to-day friendly co-operation extended to him had been a real inspiration, esponsible in large measure for any success the company had attained.

New Terminal Planned in Uniontown, Pa.

Plans for the new building to be occupied by the West Penn Railways in Uniontown, Pa., have been completed and work will be carried through to completion as rapidly as possible. The building is to be 140 ft. long, 50 ft. wide and two stories high. It will be finished in ornamental brick.

West Penn Railways will use part of the first floor for waiting room facilities and offices for the dispatcher and superintendent. On the second floor will be offices, as well as quarters for train crews. The railway track will form a loop around the building so that incoming cars will circle the terminal to discharge and pick up passengers from a platform protected by an overhanging roof.

Digitized by Google

Providing Rapid Transit a City Responsibility

Negotiations are under way to fund the $3,690,284 floating debt of the Cincinnati Street Railway. So Walter A. Draper, president, told stockholders in his annual report made on Jan. 29. Mr. Draper's report showed a total capital value as of Dec. 31, to be $34,996,240. The value of property fixed by city ordinance on Nov. 1, 1925, was $27,000,000. Additions and betterments since that year total $6,887,659.

Choosing the topic, "Looking Ahead," Mr. Draper said in part:

"In many cities the problem of local mass transportation has reached a status requiring pointed consideration and readjustment. Opinions may differ as to the transportation of the future.

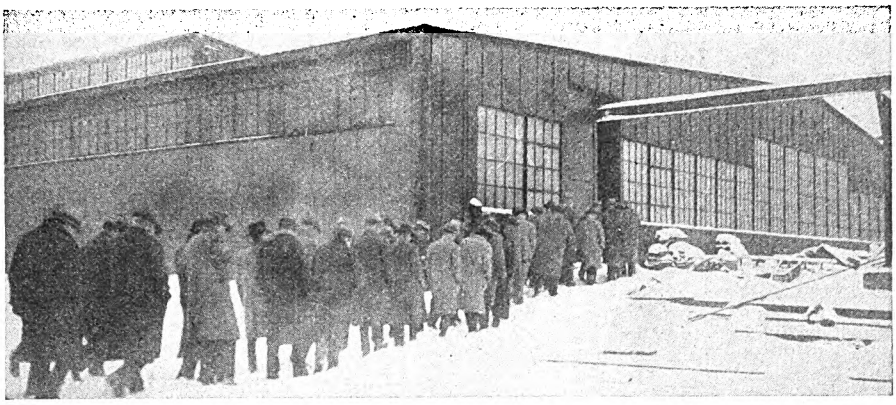
"There is no doubt that private facilities have carried an increasing number of people each year. But some public transportation always must be ready to serve, and it is necessary for the modern operator to endeavor to provide facilities that will most readily meet requirements and at a reasonable cost.

"If transportation companies cannot provide the capital necessary for constructing subways and other forms of rapid transit, the municipality will be required to aid in providing facilities. In New York, Philadelphia, Boston, and other cities various forms of municipal assistance have been extended, ranging from actual municipal ownership to the payment of subsidies of some nature.

"The form of contract existing between the Cincinnati Street Railway and the city lends itself readily to the working out of the problem as may be found necessary and best.

"The present transportation system with addition of cars from time to time is adequate to care for many more passengers than now are carried. Nevertheless, new forms of rapid transit service are being urged. The substitution of such additional facilities could not be undertaken by this company without costs too great for the users of the service to bear. The extent to which the city could participate in providing rapid transit would depend entirely upon the plan that was to be followed.

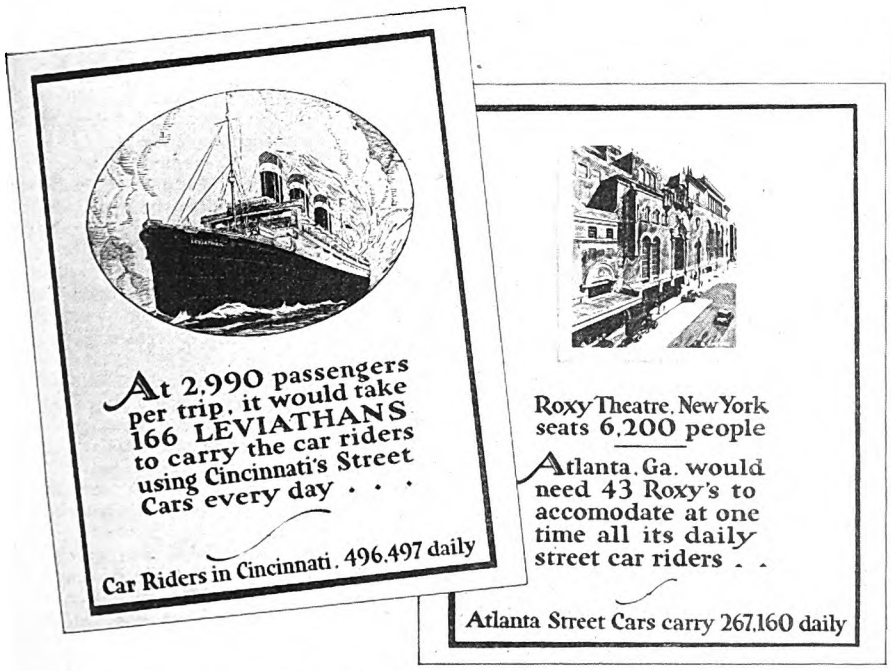
"It is hoped the fare which has continued more than four years will provide funds sufficient to meet all requirements. Should the fare control fund, however, be materially reduced, there are several ways of helping to meet the situation. One would be to have the city relieve the company of all charges that still are imposed as burdens on the car riders. Another would be to have the city, with its ability to raise money at a low rate of interest, provide certain facilities to be used by the transportation system. A charge for transfers is becoming more general throughout the country."



Overcoats were much in vogue at the recent Birmingham, Ala., meeting of the Association of Equipment Men, Southern Properties, as evidenced by this view showing the delegates wading through 5 in. of snow on the grounds of the Continental Gin Company. Following a visit to the Birmingham Electric shops, the group went to the cotton gin plant for an inspection trip and luncheon as guests of Tom Elliott, president of the company and for several years previous an executive of the Cincinnati Car Company

Ideas for Selling the Service

Inspiration for electric railway advertising men was furnished at a recent sales meeting of the Procter & Gamble Company, Cincinnati, world famed makers of Ivory soap. The advertising department desired to impress the sales force pictorially with the strength of street car advertising as used by the Procter & Gamble Company to advertise its products and reinforce the efforts of the sales department. Four large posters, two of which are reproduced herewith, were prepared by Barron G. Collier, Inc., and were loaned to the Procter & Gamble Company for this meeting. The original posters were brilliantly produced in color, making them extremely effective. They were 40 in. high and 24 in. wide. The novel comparisons employed suggest interesting copy for selling local transportation.



Novel comparisons made in Procter & Gamble (Ivory Soap) advertising suggest copy for selling local transportation

Rerouting Plan in Omaha Changed

As a result of dissatisfaction with the rerouting of the Omaha & Council Bluffs Street Railway, Omaha, Neb., which went into effect in December, a new plan has been determined by company officials to go into effect on March 2 for 60 to 90 days.

The new plan attempts to satisfy complaints made ever since the Harris rerouting plan was put into effect. Demands of Thirteenth Street property owners, who ask resumption of tram service on this street, have not been met, but President Shannahan has promised to endeavor to work out a satisfactory solution. Mr. Shannahan said: "The company is willing to give the city anything in the way of transportation it wants, providing it pays the bills. Rerouting has not proved the saving in expense anticipated. Any increased service now will only add to the company's deficit. If the commissioners will join with the company in applying to the state railway commission for better service, and if the city is willing to pay for it, we shall gladly join."

Digitized by Google

Unification Bill for New York City Introduced

A bill amending the public service commission law of New York State setting up a board of transit control in the city of New York was introduced in the New York State Senate and the Assembly on Feb. 25 by the minority leaders, Bernard Downing and Irwin Steingut. The measure represents the views of the city of New York on how unification of transit facilities can be brought about. Among other things it guarantees a 5-cent fare which would be maintained, in case of a deficit in operation, by the tapayers of the city of New York. The bill is accompanied by a statement of the minority leaders. A similar bill introduced in 1928 and again in 1929 failed to be reported in either house. It is not thought likely that the measure which has now appeared will be reported this year.

Window Wipers for Providence Cars

Recently the United Electric Railways, Providence, R. I., appropriated sufficient money to equip all of its street cars with window wipers. For some time the company has realized that operation without window wipers during stormy weather was unsatisfactory, hazardous and not consistent with safety promotion work among the employees.

Experiments were made with several window cleaners, and a wiper has been selected which will keep the glass clean during rain and snow storms and will remove sleet. The window wiper is manually operated by a hand lever near the top of the window. The operator pulls this lever and the wiper sweeps the width and length of the window, cleaning it all in one movement. Up to Feb. 15, 28 cars had been fully equipped. Wipers are on hand sufficient to equip more than 100 cars within a few weeks. It is hoped that every car on the system will be equipped by March 1.

Simpler Car Parts Proposed

O. C. Wright, superintendent of equipment of the St. Louis Public Service Company, St. Louis, Mo., in an address before the February meeting of the Birney Club, called attention to the weight of accessories on the ordinary car. A pointed question asked by the speaker was if anyone ever heard of a street car, even if it was 30 years old, which during its entire life ever had anything taken off of it. He also questioned if apparatus designed to be used on a street car was worked out in conjunction with the car body or other parts to which it is to be atttached.

A little-known fact brought out by the speaker is that for the purpose of taking power from the trolley through the motors to the ground and through the auxiliary apparatus on a modern car 50 ft. long, approximately 2,500 ft. of copper wire of various sizes is used. Some 400 ft. of pipe, or eight times the length of the car, is used to provide air brake and power door operation. Most of this consists of expensive copper tubing.

Additions of one kind or another to the equipment, Mr. Wright believes, run the cost of the modern car up to figures almost prohibitive, increase the weight, and make the operation more complex and the maintenance more difficult. He believes the time is opportune to wipe the slate clean and develop a design of a railway vehicle in which all component parts will be worked out, each in its proper relation to the other. He believes that if this plan is followed, it should be carried forward with the initiative supplied by the operator and concurred in and supported by the car builders and manufacturers of car equipment.

Protest Against Competitive Service Sustained

Setting aside a decision handed down by the Ohio Public Utilities Commission last June, the Ohio Supreme Court has ordered the Salisbury Transportation Company to return to a two-hour schedule, sustaining a protest filed by the Stark Electric Railroad against the increased service.

The two companies operate between Alliance and Canton, Ohio. The Stark Electric operates interurban cars while the Salisbury company operates buses along a route part of which parallels the Stark Electric tracks and part of which is several miles from the railway.

Last summer the state commission authorized the bus company to use two buses on an hourly schedule. The Stark Electric said the increased service was not necessary. When its protest was ignored the Stark Electric appealed to the Supreme Court.

A Source of Facts on Track

"Uniform Paved Track" is the title of the new, enlarged third edition of the "Paved Track Notebook" issued by the International Steel Tie Company, Cleveland, Ohio. In it previous data are brought up to date. The addition of a wealth of new material makes this handbook 25 per cent larger, more interesting, more useful.

The mortar-flow principle, the improved method of concreting paved track with the revolutionary "Mortar-Flow Pulsator" is fully explained. Details of how best to install compressed concrete paving, and of how to use the new vibrated grout method of construction for early service are given.

Research results on concrete and steel bond are presented for the first time. Modernized twin ties with the new "Precision" rail clip and heat-treated bolts are completely described.

Two new types of track construction are shown. Paved track design is discussed from the executive's viewpoint.

Unit pressures on the subgrade with concrete foundation and stone ballast are compared. A new section has been added on waterproofing the track structure and subgrade drainage.

Initial cost comparisons are given for typical installations. A table of units of track work per man-hour on more than 60 miles of track, permits application of these data to local conditions.

A reference section with notes on concrete, and a convenient table of cubic contents of typical track trenches completes the "Uniform Paved Track Notebook."

Conspectus of Indexes for February, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares* 1913 = 4.84	Feb., 1930 **7.87**	Jan., 1930 **7.85**	Feb., 1929 **7.75**	Feb., 1930 **7.87**	Feb., 1925 **7.24**
Electric Railway Materials* 1913 = 100	Feb., 1930 **142.9**	Jan., 1930 **144.4**	Feb., 1929 **145.0**	Dec., 1926 **159.2**	Feb., 1928 **139.5**
Electric Railway Wages* 1913 = 100	Feb., 1930 **231.7**	Jan., 1930 **231.3**	Feb., 1929 **229.9**	Feb., 1930 **231.7**	Feb., 1925 **221.0**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	Feb., 1930 **203.9**	Jan., 1930 **204.5**	Feb., 1929 **205.2**	Nov., 1928 **205.7**	July, 1929 **199.0**
General Construction Cost Eng'g News-Record 1913 = 100	Feb., 1930 **206.5**	Jan., 1930 **209.0**	Feb., 1929 **210.4**	Jan., 1927 **211.5**	Nov., 1927 **202.0**
Wholesale Commodities U. S. Bur. Labor Stat. 1926 = 100	Jan., 1930 **93.4**	Dec., 1929 **94.2**	Jan., 1929 **97.2**	Nov., 1925 **104.5**	Jan., 1930 **93.4**
Wholesale Commodities Bradstreet 1913 = 9.21	Feb., 1930 **11.51**	Jan., 1930 **11.68**	Feb., 1929 **12.98**	Dec., 1925 **14.41**	Feb., 1930 **11.51**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	Jan., 1930 **155.4**	Dec., 1929 **158.0**	Jan., 1929 **154.6**	Nov., 1925 **167.1**	Apr., 1925 **150.8**
Cost of Living Nat. Ind. Conf. Board 1914 = 100	Jan., 1930 **160.4**	Dec., 1929 **162.0**	Jan., 1929 **160.9**	Nov., 1925 **171.8**	Apr., 1929 **159.3**
Industrial Activity Elec. World, kw.-hr. 1923–25 = 100	Jan., 1930 **121.8**	Dec., 1929 **116.4**	Jan., 1929 **132.5**	Feb., 1929 **140.4**	Aug., 1925 **94.3**
Bank Clearings Outside N. Y. City 1926 = 100	Jan., 1930 **95.2**	Dec., 1929 **98.6**	Jan., 1929 **108.7**	Oct., 1929 **111.8**	Nov., 1926 **94.0**
Business Failures Number	Jan., 1930 2368	Dec., 1929 1827	Jan., 1929 2184	July, 1929 1581	Sept., 1928 1348
Liabilities, Millions of Dollars	**78.55**	**67.38**	**56.19**	**102.09**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Digitized by Google

Decision Reserved in Buffalo Fare Case

Federal Judge Hazel in United States District Court at Buffalo, N. Y., has reserved decision on the application of the International Railway for appointment of a three-judge court to fix a valuation figure upon which fares may be based. The railway seeks a 10-cent fare in Buffalo and increased fares in Niagara Falls and Lancaster. Judge Hazel indicated that he would give the cities in which increased fares are asked sufficient time in which to prepare for the suit. It also was indicated that the court would like to have the railway take its case back to the commission.

Another Fare Proposed in Columbus, Ohio

A 7-cent cash fare with five tickets for 35 cents has now been proposed by the Columbus Railway, Power & Light Company, Columbus, Ohio, but the City Council has voted to postpone action on the proposal. The company has been operating without a franchise since 1926, but has kept the fare at 6 cents cash since that time.

$1,250,000,000 for New York's New Rapid Transit Lines

The 1929 annual report of the New York Transit Commission emphasizes progress in grade crossing elimination during the year, mentioning particularly the fact that plans have been agreed upon for doing away with "Death Avenue" in New York City as part of the West Side improvement.

It also mentions prominently settlement of a large number of disputed accounting items as a result of which the Interborough Rapid Transit Company paid New York City $6,291,118 on account of accrued deficit up to June 30, and $2,309,696 thereafter, and also put $2,958,881 into the depreciation fund for the period up to June 30, and $500,000 for the succeeding six months.

Of the new subways, the report says that although parts of the Eighth Avenue system are to be in operation in 1931, the commission's estimates of traffic are so large that already East Side trunk lines are being planned; the city's investment in existing subways is $380,000,000; the Eighth Avenue system is to cost $650,000,000 and the other new lines are to cost $600,000,000 more.

The report traces the progress of the Interborough 5-cent fare litigation during the year. The commission says that this issue "involved a tremendous amount of work, attracted national attention and engaged the leading lawyers of the country," and remarks that it "was most fortunate" in having as its chief counsel Samuel Untermyer, who, with his son, Irwin, "successfully upheld the contentions of the commission and the city on the contract" and performed all of these services without charge.

Engineers Inspect Cleveland Terminal

Inspection of the electrification being installed for the operation of the steam railroads entering Cleveland as operated by the Cleveland Union Terminals Company was the feature of the meeting of the committee on heavy electric traction of the American Electric Railway Engineering Association held on Feb. 19.

Following a short business meeting, luncheon was served in the rooms of the Cleveland Association of Commerce. The party was then taken over the terminal building, the electrified tracks and the locomotive repair shops. The meeting and trip were arranged by W. E. Huber of the Electric Railway Improvement Company and L. W. Birch of the Ohio Brass Company. It was made possible through the courtesy of Messrs. Jouett and Pinkerton of the Terminal Company.

Members who were present included L. C. Winship, chairman; H. F. Brown, C. H. Jones, K. T. Healy, Mr. Billau representing J. H. Davis, J. S. Hagan, O. E. Staples representing S. B. Cooper, E. P. Chase representing J. V. B. Duer, W. E. Huber, F. W. Butt, A. H. Daus, Morris Buck, J. M. Bosenbury, L. W. Birch, H. H. Febrey, J. T. Hamilton, W. M. Vandersluis, J. S. Thorp and G. I. Wright. Guests present included Messrs. Bovard, Pierce, D. H. Moore, E. B. Moore and Tieterman.

Brady Medals Awarded at Meeting in New York City

In the presence of members of the Metropolitan Section, A.E.R.A., and visitors from other cities the Anthony N. Brady Memorial Awards for safety of operation during the year 1928 were presented at the Engineers' Auditorium, New York City, on Feb. 7. Edward Dana, general manager, Boston Elevated Railway, accepted the gold medal for cities of the first class. He brought with him to share the honors five operators, one chosen from each division of the property because of outstanding accomplishment in safe operation over a period of years. The Tampa Electric Company, winner for the second time of the silver medal for cities in the second class, was represented by Superintendent Sheridan and two operators. The bronze medal for cities in the third class, was again awarded to the Tide Water Power Company, Wilmington, N. C. Honorary mention went to the Louisville Railway and to the El Paso Electric Company.

Charles Gordon, managing director, A.E.R.A., addressed the meeting. He said that accidents to passengers on electric railways are decreasing steadily. Only one passenger out of every 280,000,000 carried last year was fatally injured. This record was made possible by an unceasing and aggressive campaign of accident prevention in which the electric railways are constantly engaged.

An inspiring address by Harry Cordell, master mechanic, Chicago, North Shore & Milwaukee Railroad, was a feature of the meeting.

First Serious North Shore Accident in Ten Years

Eleven persons were killed and many were injured when a Chicago-bound passenger train of the Chicago, North Shore & Milwaukee Railroad struck an automobile at a grade crossing just north of Kenosha late on the night of Feb. 23 and was derailed.

The automobile was hurled directly into the path of a northbound freight train, as the five cars of the passenger train left the track.

The first car of the passenger train buried its nose in the soft mud of the ditch. The car behind piled into it. The three rear cars also went into the ditch, but their passengers were more fortunate than those in the two forward cars.

It was the first time in ten years that a passenger on the North Shore Line had met death in an accident.

The facts appear to be that the occupants of the automobile which was struck ignored the warning signal at the crossing, paid no attention to another private car which had been brought to a stop near the crossing and then in an effort to beat the northbound freight crossed directly in the path of the on-rushing southbound passenger train.

In accordance with its regular policy, the Interstate Commerce Commission will investigate the accident. To that end A. H. Leonhart, from Green Bay, and H. M. Burtch, from Chicago, inspectors of the commission, have been ordered to Kenosha. It is not believed that the report from these inspectors will be submitted to the commission much before the end of March.

400 Newark Cabs Pass to the Public Service

Public Service Co-ordinated Transport, Newark, N. J., has acquired control of Yellow Cab, Inc., through purchase of the majority of the capital stock. Yellow Cab, Inc., is the largest taxicab company in north Jersey and operates in Newark and vicinity. It also controls the Yellow Cab of Union County and the Brown & White Taxicab Company of Newark. It operates 400 cabs in Newark. Public Service will take over active operation as soon as details can be arranged. No announcement was made as to the consideration paid for the stock.

TWENTY YEARS' GROWTH IN TOTAL OF REVENUE PASSENGERS

	1909	1919	1929
Interborough Rapid Transit Company:			
Subway	238,430,146	461,147,058	932,446,803
Elevated	276,250,196	348,188,600	348,569,124
New York Rapid Transit Corporation and predecessors	143,816,821	305,021,402	690,829,232
Total	658,497,163	1,114,357,060	1,971,845,159
Surface car passengers	729,728,127	879,536,422	984,596,886
Bus passengers	3,609,304	36,983,726	125,326,259
Grand total	1,391,834,594	2,030,877,208	3,081,768,304

RAPID TRANSIT TRAFFIC IN WORLD'S LEADING CITIES

	Passengers Carried in 1928	Miles of Double Track	Passenger Per Year Per Kilometer	Percentage of Total Traffic Carried by Subways
New York	1,910,000,000	211	6,200,000	57
London	465,112,000	155	3,000,000	30
Paris	818,334,000	68	7,300,000	55
Berlin	265,229,000	38	4,800,000	20

Digitized by Google

Progress Reported in Springfield, Ohio

Settlement of the transit problem at Springfield, Ohio, apparently awaits a decision of the courts as to whether paving assessments and unpaid franchise fees constitute a lien on the company's assets, prior to the rights of the bondholders. A four-hour conference on Feb. 21, however, between the city officials and executives of the Cincinnati & Lake Erie Railroad, with Thomas Conway, Jr., president, acting as spokesman, served to clear up a number of confusing points.

The railway company proposes to purchase the property of the Springfield Railway from the receiver, and then to set up a system whereby some of the present narrow gage tracks will be continued and others abandoned in favor of the standard gage service over the interurban tracks, augmented where necessary by trolley bus service. It was agreed that the company would be relieved of future paving assessments if the city loses in its present suit against the street railway receiver.

The main problems at present are those of a twenty-year franchise, a service-at-cost plan, and the appraisal of the railway under the service-at-cost plan. The company offered to reimburse the city for his service charge if an expert appraisal engineer estimated the property at a lower valuation than that contained in the company's proposal.

BOOK REVIEWS

Mastering a Metropolis

"Planning the Future of the New York Region." By R. L. Duffus. Harper & Brothers, New York. 302 pages, illustrated. Price $3.

City and regional planners, architects, and those interested in the growth of the modern city will find this book fascinating reading. City dwellers and commuters, especially those who live in the New York region, will be relieved as well as interested by the projects now under consideration, which are so clearly and entertainingly set forth in this volume.

"Planning the Future of the New York Region" really is the authorized popularization of the ten detailed and technical volumes published by the Committee on the Regional Plan of New York and Its Environs. The author describes in popular language the outstanding features of the comprehensive plan worked out by this committee after seven years' study and research at a cost of $1,000,000. Many maps and illustrations help the reader visualize the extraordinary development which is outlined here.

Review of New York Association's Work

Proceedings of the quarterly and annual meetings in 1924 and 1925 of the New York Electric Railway Association; 373 pages; published by the association.

The meetings of state and sectional associations, being smaller than those of national associations, afford an intimacy of contact among the members not offered by the larger organizations. They are, therefore, often productive of very valuable material. The sessions reported in this volume are of that nature.

Railroad Electrification Economics

"Electrification of Steam Railroads." By Kent T. Healy, assistant professor of transportation, Yale University. McGraw-Hill Book Company, Inc., New York. 395 pages, illustrated. Price $5.

Professor Healy's treatise on steam railroad electrification was written following a six-month survey of the electrifications of Europe, which was made subsequent to several years of experience with one of the leading electrified steam railroads of America. The author has stressed the economics of electrification, devoting an entire chapter to this subject, and considering each element from this standpoint.

Power and its supply are given a prominent place in the book, taking somewhat more than half of the space. The power contract is analyzed in considerable detail, since the author devotes much of his attention to the purchase of energy from some outside source. Substations, switching and sectionalizing are taken up in two chapters, the various methods used in this country and in Europe being discussed in detail. Overhead supporting structures, the contact system, co-ordination of electric fields and economics of transmission and distribution are covered in five chapters. Motive power, including current collection, traction motors and control, transmission of power from the motors to the driving wheels and mechanical elements of locomotives, is analyzed for many types of equipment.

The book is valuable for the engineer or the economist who is considering electrification as a means of improving railroad operation. It gives information which is essential in making a comparison between existing methods with steam and the methods that have been developed in successful electrifications. The author does not contend that electrification is useful everywhere. He says that it now is possible to study "the principles involved which are decidedly topics for discussion, and the indication of the dangers which are ever present in any analysis."

Electric System Handbook

By Clarence H. Sanderson, editor-in-chief. First edition. Illustrated. McGraw-Hill Book Company, New York. 1,167 pages. $5.

Here is a handbook different from those usually presented. It tells the story of the electric system as a whole in form which can be understood by the non-technical reader. It is more in the nature of a textbook than a handbook, as the term ordinarily is understood. Students of engineering, operators, inspectors, maintenance and test department employees and engineering draftsmen should find it helpful.

Railway substations, including the use of mercury arc rectifiers and automatic control equipment, are discussed in a separate section of 67 pages.

Annual Safety Congress Transactions

National Safety Council, Publicity Division, Chicago, Ill. 325 pages. 50 cents.

Complete transactions of the public safety, education and women's sessions of the Eighteenth Annual Safety Congress, held in Chicago, Sept. 30-Oct. 4, 1929, are now available. The volume contains authoritative papers and discussions on public education for safety, uniform traffic laws and ordinances, accident reports and statistics, law enforcement, traffic engineering and control, traffic signs and signals, mental and personal causes of accidents, school safety work, junior safety councils, vocational schools, and safety work of women's organizations.

Elektrische Bahnen

By D. O. Höring. Published by Siemens & Halske, A. G., and Siemens-Schuekertwerke, A.G., Berlin, Germany.

This book discusses in detail the development of the electric street railway and electric railroad since the first appearance of an electric train at the Industrial Exhibition in 1879 in Berlin. The extent of electrification in Europe is reviewed in the first chapter and it was found that at the end of 1927 the mileage of electric railroads amounted to 5,387 miles, while countries outside of Europe had electric railroads amounting to 3,157 miles.

The various types of electric motor cars and locomotives are discussed extensively while the advantages of alternating current and direct current are compared also. Although the book discusses especially the rolling stock, considerable attention is given to way and structures, and overhead and signal construction and installation.

Safeguarding Instalment Sale Contracts

"Conditional Sales. Law and Local Practices—for Executive and Lawyer." By Roger Sherman Hoar. The Ronald Press Company, New York. 521 pages. $10.

Selling of goods on the instalment plan has become one of the standard commercial practices all over the United States. The author indicates in detail the legal differences between various plans in use for instalment selling, and the dangers that beset the seller if the contract is not properly drawn and executed. Since practice varies in the several states, each one is taken up in detail, and local practice and tactics are explained where the law is not clear.

While sales of rolling stock under equipment trusts are not considered in detail, the author points out that special laws covering such sales exist in all states and territories except the District of Columbia, Texas and Virginia. Some of the laws in other states do not differ greatly from the general laws.

Any railroad or other utility buying or selling merchandise on the instalment plan will find in this book a wealth of information, with specific references to decisions on the various points involved.

Steam Railroad Statistics for 1928

Forty-second Annual Report on the Statistics of Railways in the United States. Interstate Commerce Commission. Government Printing Office, Washington, D. C. For sale by the Superintendent of Documents. $1.40.

This is the annual report of the Interstate Commerce Commission on the operation of the steam railroads for 1928, but it includes selected data on other common carriers subject to the interstate commerce act, among them statistics of 223 electric railways reporting to the commission. For 1928 the electric railways had gross revenues of $167,173,838 on an investment of $1,264,533,842 for road and equipment.

Digitized by Google

PERSONAL MENTION

Henry Bucher of Interstate Assumes New Duties

Takes Up Post in Indianapolis in Which He Will Co-ordinate Interurban and City Lines of Vast Insull Undertakings

HENRY BUCHER, recently appointed general railroad executive of the electric railway properties in Indiana controlled by Midland United Company, has taken over his new duties at Indianapolis.

Operation of the electric interurban and street railways of the Indiana Service Corporation, Interstate Public Service Company and Northern Indiana Power Company will be co-ordinated under Mr. Bucher. This will involve no change in ownership or identies, but efforts will be made to obtain the advantages of one general supervision.

Mr. Bucher has been manager of railways of the Indiana Service Corporation

Henry Bucher

at Fort Wayne for the past six years, having succeeded Sam W. Greenland in 1924. More recently, he also has held the position of manager of the Fort Wayne division of the Indiana Service Corporation, Northern Indiana Public Service Company and Northern Indiana Power Company, in charge of gas, electric and railway properties.

Prior to his going with the Indiana Service Corporation in 1924, Mr. Bucher was associated as a consulting engineer for ten years with Robert M. Feustel, now president of the Indiana Service Corporation and executive vice-president of the Midland United Company. While engaged in this work he made appraisals and valuations for many electric railways throughout the country. From 1910 to 1914 Mr. Bucher held a position with the joint engineering department of the Wisconsin Railroad Commission and the Wisconsin Tax Commission. He was graduated from the University of Wisconsin with an engineering degree in 1909.

William H. Snyder, chief clerk of the Indiana Service Corporation railway department since 1913, accompanied Mr. Bucher to Indianapolis, where he will continue as chief clerk of the co-ordinated railway department.

Mr. Bucher's position as division manager at Fort Wayne has been taken by Harry E. Vordermark, vice-president and treasurer of the Indiana Service Corporation. Assisting Mr. Vordermark as local managers are James S. Clark, light and power department; J. F. McKay, Fort Wayne city railways, and M. P. Royal, gas department.

✦

A. J. Berta Treasurer of North American Power Company

A. J. Berta, formerly assistant treasurer of the North American Light & Power Company, Chicago, and its subsidiaries, has been elected treasurer of these companies, succeeding P. L. Smith. As assistant treasurer, he was in close touch with every operating group. Mr. Berta's career in the public utility field began with the Middle West Utilities Company, in 1918. The foundation of his banking experience was obtained with the Harris Trust Savings Bank and the National City Company. The latter company lost his services when he was employed by Mr. Smith. On Feb. 16, Mr. Berta celebrated his tenth anniversary with this company and its predecessors.

✦

J. J. McNally in Advertising Field

James J. McNally, formerly with the advertising department of the Washington Railway & Electric Company and the Potomac Electric Power Company, Washington, D. C., has announced the organization of Associate Advertisers to conduct an advertising service specializing in utility accounts. The new service will also act as advertising counsel for public utilities and allied industries. Before going with the Washington Railway & Electric Company, Mr. McNally was connected with Samson Service.

✦

"Tom" Minary Resigns as Chairman at Louisville

Thomas J. Minary, chairman of the board of directors of the Louisville Railway, Louisville, Ky., for the past ten years, and prior to that president of the company, recently tendered his resignation to the directors. It was accepted and the post of board chairman was abolished. Mr. Minary remains on the board of directors.

The former chairman will have been connected with the company and its predecessors 58 years in May. Mr. Minary is now 79 years old. He became secretary-treasurer of the Central Passenger Railroad Company in 1872. He was only 21 years old at the time.

Consolidation in 1889 of this concern with the Citizens' Passenger Company and the City Railway resulted in the establishment of the present Louisville Railway. Mr. Minary became general manager after the consolidation. Then for a period of 23 years he served as president of the company before his election to the chairmanship of the board.

✦

Col. C. H. Harvey Made Chairman at Knoxville

Col. C. H. Harvey tendered his resignation on Feb. 8 as president of the Knoxville Power & Light Company, Knoxville, Tenn., a position he has held for more than 25 years, to gratify his desire for "greater leisure than is possible under present responsibilities." His resignation was accepted by the directors, who then elevated him to the chairmanship of the board—a post which will enable him to keep in close touch with the affairs of the company. The board took no action toward filling the presidency. The duties formerly performed by Colonel Harvey will be taken over by Fred. V. Underwood, the vice-president and general manager.

Colonel Harvey went to Knoxville in

Col. C. H. Harvey

1885, immediately following his graduation from the University of Michigan, and became secretary to the general manager of the East Tennessee, Virginia & Georgia Railroad, the predecessor of the Southern. While employed there, he worked at night on the books of the Knoxville Electric Light & Power Company. In 1902 he was appointed general manager of both companies and two years later was elected president and general manager.

Colonel Harvey organized the two utilities into the Knoxville Railway & Light Company, which later became the present Knoxville Power & Light Company. In 1925 Colonel Harvey gave up his duties as general manager, and since then has been engaged only in the administrative activities as president of the company.

Mr. Underwood went to Knoxville about five years ago to assume the duties of general manager. He has been connected with electric power interests practically all of his life and in Birmingham he held a position similar to that which he holds in Knoxville.

Digitized by Google

F. H. Brooks Now President of Lincoln Traction Company

F. H. Brooks of Lincoln, Neb., who was recently made president and general manager of the Iowa-Nebraska Light & Power Company and the Lincoln Traction Company, with headquarters at Lincoln, has been with the Continental Gas & Electric Corporation, a subsidiary of the United Light & Power Company, since its inception in 1913, first as general manager and then as vice-president and general manager of its properties in Nebraska, Iowa and Missouri, now known as the Iowa-Nebraska Light & Power Company.

Mr. Brooks' public utility career and operating experiences have been broad and varied. He started in the street railway field in Erie, Pa., in 1896. Later his activities took him into the copper regions of Michigan, where he did electrical engineering work for the Edison company of Sault Ste. Marie and the Peninsula Electric Light & Power Company. In this field

Frank H. Brooks

Mr. Brooks did pioneering work in hydro-electric and long-distance transmission development. Later he became general manager of the Vicksburg Railway & Light Company, Vicksburg, Miss.

In addition to management, operating and executive work, Mr. Brooks has also been active in state, sectional and national associations in the utility field.

✦

Chairman Prendergast Resigns from New York Commission

William A. Prendergast, chairman of the New York State Public Service Commission, tendered his resignation to Governor Roosevelt on Feb. 4. Governor Roosevelt said:

"Mr. Prendergast has had a very long and distinguished career as a public official and as member and chairman of the Public Service Commission. I regret he is bringing this long service to a close."

Chairman Prendergast issued a formal statement in which he said:

"At an interview with Governor Roosevelt I presented my resignation. The Governor has certain ideas relative to the regulation of public utilities in this state with which I am not entirely in sympathy. I do not feel that the Public Service Commission, which has quasi-judicial functions, should be influenced in the exercise of those functions by the executive or any other state agency. I explained my attitude upon these matters to the Governor. I appreciate the Governor's generous statement regarding my resignation."

The present commission is composed of three Democrats and two Republicans. The new chairman will be named by the Governor, but will have to be confirmed by the Senate. Mr. Prendergast's resignation became effective on Feb. 28.

✦

Changes in El Paso Personnel

F. J. Gannon, since January, 1929, manager of the El Paso Electric Company, Rio Grande Valley Traction Company, and the Mesilla Valley Electric Company, has been made president of these companies and a member of their boards of directors. Mr. Gannon has been president of the El Paso & Juarez Traction Company, and a member of its board since his advent in El Paso. In his new position he will continue actively to manage all four companies.

R. O. Himel, formerly assistant treasurer of the El Paso Electric Company, Rio Grande Valley Traction Company and Mesilla Valley Electric Company, has been made treasurer of the companies. For some time he has been a director of the El Paso & Juarez Traction Company.

J. B. Ledlie, formerly superintendent of the Mesilla Valley Electric Company, Las Cruces, N. M., a subsidiary of the El Paso Electric Company, has been made vice-president of the Mesilla Valley company.

L. S. Thorne, general superintendent of railways, El Paso Electric Company, is also a director of the El Paso & Juarez Traction Company.

✦

Central Association Vice-Presidents

R. R. Smith, of the Chicago, South Bend & Northern Indiana Railway, was elected first vice-president of the Central Electric Railway Association, and F. H. Wilson, of the Cleveland-Southwestern Railway & Light Company, was elected second vice-president at the recent winter meeting of the organization held in Cleveland. The names of the two vice-presidents were interchanged in the article in the ELECTRIC RAILWAY JOURNAL for February, 1930, page 90.

✦

M. E. Welsh in Charge of Central's Electric Division

Michael E. Welsh, superintendent of the Syracuse division of the New York Central Railroad, has been made superintendent of the electrical division with headquarters in New York City. Charles E. Olp, superintendent of the Rochester division, will succeed Mr. Welsh at Syracuse.

Mr. Welsh has been associated with the New York Central ever since he was twenty years old. He entered the service as a brakeman on the Syracuse division in 1891. Four years later he was promoted to be freight conductor and in 1901 was made passenger conductor. In 1907 he became assistant trainmaster and was elevated to trainmaster of the Rochester division in the following year.

Three years later he was sent to Buffalo as trainmaster and in 1918 was made assistant superintendent there. Mr. Welsh was superintendent of the Ontario division with offices in Oswego in 1923, and superintendent at Buffalo later the same year. He went to Syracuse as superintendent of the Syracuse division in 1927.

Two New Vice-Presidents for St. Louis Car

Nelson L. Rehnquist and Howard R. Gass were elected vice-presidents of the St. Louis Car Company, St. Louis, Mo., at the annual meeting on Jan. 28. George L. Kippenberger was elected first vice-president and assistant general manager. Edwin B. Meissner was re-elected president and general manager.

Mr. Rhenquist joined the St. Louis Car organization in 1911 when President Meissner came from the Milwaukee Electric Railway & Light Company to accept the executive direction of the company. With the St. Louis Car Company Mr. Rhenquist worked up through several positions until in 1916 he was made purchasing agent. When the company entered the airplane construction field a year ago he was asked to give executive attention to that division, but continued to supervise the purchases for the company. As vice-president he will continue as execu-

Howard R. Gass

tive for the aviation and purchasing departments.

Mr. Gass has served as a sales engineer since he joined the company on May 1, 1921. As vice-president his duties will be connected with the sales department. For seven years prior to joining the company, he was with the Missouri Public Service Commission. He had charge of the field operations for the commission in connection with the United Railways, the Union Electric Light & Power Company, the Kansas City Railways and the Electric Light Company of Kansas City valuations as well as other similar undertakings. He also inspected all steam and interurban railroad properties for the state commission annually.

Prior to entering the service of the Missouri commission, Mr. Gass was a field engineer for the North Kansas City Development Company in charge of levee, sewer, street paving and building operations. He has also been associated with the Kansas City Southern Railroad, the Missouri, Kansas & Texas, the Chicago, Rock Island & Pacific, the St. Louis-San Francisco Railway and the New York Central Lines as a locating and construction engineer.

As a field engineer for Paret & Beard, consulting engineers, Kansas City, Mo., he made hydro-electric surveys on the Waschita River in Arkansas, and also basic surveys and estimates for the Wichita Terminals and a valuation of stock yard properties in Wichita. He had charge of the subway and viaduct construction, third

Digitized by Google

division, Kansas City Terminal Railways, and also was in charge of pre-cast slab concrete construction and of all subways and viaducts during the building of the Union Station and terminal project in Kansas City, Mo.

A. N. Baldwin, long connected with the Central California Traction Company, Stockton, Cal., as secretary and treasurer, has been elected a director of the Yellow & Checker Cab Company, San Francisco, Cal.

✦

Messrs. Draffan, Springer and Strickler Advanced

Announcement has been made by the Ohio Brass Company, Mansfield, Ohio, of the election of G. L. Draffan as secretary and of W. A. Springer as treasurer, and of the appointment of J. M. Strickler as general sales manager.

Mr. Draffan began his business career with the Roycrofters, under the leadership of the late Elbert Hubbard at East Aurora, N. Y. Here he devoted himself to a study of the advertising business until the death of Mr. Hubbard, at which time he took a position in the office of the East Aurora Electric Light Company. In 1916 Mr. Draffan entered the employ of the Ohio Brass Company as assistant advertising manager. He served in this capacity until 1923 when he became assistant to E. F. Wickwire, then secretary of the company. In 1927 he was made general sales manager, a position he held until his election to the secretaryship which carries with it the duties of director of sales.

J. M. Strickler

G. L. Draffan

W. A. Springer

MR. SPRINGER ANOTHER LONG-SERVICE EMPLOYEE

Practically the whole of Mr. Springer's business life has been devoted to the Ohio Brass Company. He became a member of the Ohio Brass organization in 1912 after completing a four-year course at the Mansfield High School. His apprenticeship was served under B. F. McLean in the record department. He was next transferred to the managership of the traffic department, in which the opportunity was presented to learn much of the business in connection with his work of supervising O-B shipments to all parts of the world. For the past five years he has been assistant to the treasurer, handling, among other things, the forwarding and collecting of export shipments, and at the same time learning under the tutelage of C. V. Marks to master the intricacies of the company's finances. In this capacity he served until his recent election to the post of treasurer of the company.

At the completion of his high school career in 1906, Mr. Strickler joined the O-B company as office boy. Six months later saw him moving up the ladder. The order, traffic, hi-tension, car equipment, bond and third rail, line material, pintype insulator and general sales departments have all been stepping stones in his varied career. In 1927 he was made assistant general sales manager and now he has been made general sales manager of the organization.

Messrs. Mathias and Covert New Assistant Auditors for Westinghouse

H. N. Mathias and V. F. Covert have been elected assistant general auditors of the Westinghouse Electric & Manufacturing Company.

In rising from the ranks of the accounting department the two men took paths widely separated at first. Mr. Mathias has a service record with Westinghouse which began in 1899. Mr. Covert came to Westinghouse in 1911 from the old E.M.F. Motor Company, Detroit.

Mr. Mathias was born in Madison, Pa. After a business course in Pittsburgh he joined the Westinghouse Company. In 1908 he was made chief cost clerk. In 1917 he was made assistant to the general auditor. In 1928 he was appointed supervisor of costs and budgets. In his new post Mr. Mathias will have charge of installing standard cost and works accounting and will direct all works auditors.

Mr. Covert's first position with the Westinghouse Company was as payroll clerk. In 1917 he became assistant auditor of the Krantz Manufacturing Company, Brooklyn, a subsidiary. The same year he was sent to the Westinghouse South Philadelphia Works in charge of general accounts. In 1924 he was made works auditor in South Philadelphia. He returned to East Pittsburgh in 1926 and in 1928 he was appointed supervisor of district accounting.

W. P. Jackson in Safety Work for California Commission

W. P. Jackson has been appointed service inspector in the safety division of the California Railroad Commission in charge of inspection of mechanical and electrical equipment on electric railway systems and stages under the jurisdiction of the commission. He will work under the direction of H. L. Engelhardt, safety engineer of the commission.

Mr. Jackson has been connected with the Sacramento Northern Railway, first division, for a number of years, in charge of mechanical equipment. Prior to that he was superintendent of equipment for the Key System Transit Company, Oakland, Cal. Many years experience on electric railways throughout the country further qualify him for the work he is undertaking.

Through the establishment of a separate division of safety the commission is making a concerted effort to insure uniform safety conditions of operation and equipment on all electric railway systems and stage lines throughout California. Field inspections, it is hoped, will eliminate unsafe practices and faulty equipment among the common carriers. The division has been in existence only a little more than seven months.

✦

Personnel Changes Follow Expansion in New Jersey

Public Service Co-ordinated Transport, Newark, N. J., has made the following changes in operating personnel:

Edward D. Cone has been appointed assistant manager of the Essex division. Mr. Cone was superintendent of transportation in the Hudson division.

In the Essex division, Spencer G. Harvey, Aaron H. Hill, J. B. McCallum and George M. Klement have been named district superintendents, each to have charge of one of the four districts into which the division has now been divided.

They report to James M. Symington, manager, who will continue in general charge of the division. Mr. McCallum has charge of the northern district, which includes Big Tree carhouse, Summer Avenue garage, Miller Street carhouse, Rutherford carhouse, Harrison carhouse and Belleville Pike garage; Mr. Klement, Bloomfield district, including Montclair carhouse, Great Notch garage, Lake Street garage and Sixteenth Avenue carhouse; Mr. Harvey, Orange district, including Central Avenue carhouse, Roseville carhouse, City Line garage, Orange and Passaic Valley carhouse and Grove Street garage; and Mr. Hill, southern district, including Hilton carhouse, South Orange carhouse and Sherman Avenue garage.

The superintendents have jurisdiction over carhouses and garages in their districts. Jurisdiction over service in the territory embraced in the city of Newark is assigned to division superintendents whose lines serve it.

George A. Rothery has been appointed assistant manager, Hudson division. Mr. Rothery was manager of the company's southern division. David H. Roszel also remains as assistant manager, Hudson division.

Herbert E. Harper has been appointed manager of the southern division, and George W. Booz and Claude L. Sell have been appointed assistant managers in that division.

Digitized by Google

L. C. Bullington Appointed General Sales Supervisor

L. C. Bullington, formerly manager of the Detroit office of the Westinghouse Electric & Manufacturing Company, has been appointed general sales supervisor of that company with his office at the East Pittsburgh Works.

Mr. Bullington joined Westinghouse, Church, Kerr & Company in 1889. In 1903, when the organizations entered into a merger, he was transferred to the sales department of the Westinghouse Machine Company with his headquarters in Atlanta. Later Mr. Bullington was transferred to the Buffalo office in a similar capacity. In 1918 he went to East Pittsburgh as assistant to the manager of the power department. From that position he was promoted in June, 1922, to assistant manager of the power sales department. In 1925 he was made manager of the Cincinnati office; and in 1928 he went to the Detroit office.

✦

Curtis F. Jones Named to Louisville Board

Curtis F. Jones, employee of the Kentucky Carriers, Inc., bus subsidiary of the Louisville Railway, Louisville, Ky., has been nominated for employee-director of the railway. An employee-director has been chosen for seven years. Mr. Jones is 32 years old. He has been employed by the company for ten years. He is a veteran of the World War and was a member of the 91st Division. His brother, Wilbern T. Jones, motorman of the Broadway line, recently was awarded the Anthony J. Connelly medal and $75 as the employee rendering the most outstanding service in 1929.

✦

J. P. Potter to Head Pacific Railway Club

J. P. Potter, vice-president of the Key System Transit Company, Oakland, Cal., has been named by the nominating committee of the Pacific Railway Club for the office of president during the coming year. He is at present the club's vice-president.

Frank E. Russell, now mechanical engineer of the Southern Pacific Company, has been nominated for first vice-president, and L. L. Galbraith, a conductor for the Atchison, Topeka & Santa Fe Railway, for second vice-president. D. C. Wilkins, commercial agent of the Western Pacific Railroad Company, is the committee's nominee for treasurer. The club's election occurs March 13.

✦

W. H. Onken, Jr., Retires from the "Electrical World"

William H. Onken, Jr., for years prominent in the electrical industry as an editor of *Electrical World,* a McGraw-Hill publication, has resigned and retired from his long association with this paper. Since 1900 he has been active as a writer and editor in the electrical field. Mr. Onken began his journalistic work as a reporter on the staff of the New York *Evening Post.* Leaving this work he took a course in electrical engineering at the Brooklyn Polytechnic Institute. He came to the *American Electrician* in 1901 as an experienced reporter and writer with a definite faculty for news gathering. Later the *American Electrician,* a monthly, was consolidated with *Electrical World,* a weekly, and Mr. Onken has continued with the paper since that time as associate editor, as managing editor, as editor and more recently as senior editor.

✦

Charles J. Ellis Now with Brill

Charles J. Ellis, until recently chief engineer of the Cincinnati Car Company, Cincinnati, Ohio, has been appointed sales engineer in the electric car and truck division of the J. G. Brill Company. Mr. Ellis has a broad experience in the car-building field, dating back to 1911 when he started with the Cincinnati Car Company as a draftsman. He subsequently served in various other capacities, successively becoming chief draftsman, sales engineer and chief engineer.

✦

Harry Maze has resigned as superintendent of motor coach operations of the Union Traction Company, Anderson, Ind., to accept a position with an insurance company in Indianapolis. No successor has been named. The Union Traction Company operates more than 220 miles of bus route in Indiana.

✦

Hugh M. Tate, a lawyer of Knoxville, has been nominated by President Hoover to be a member of the Interstate Commerce Commission, to succeed Richard V. Taylor of Alabama, whose term expired Dec. 31. Mr. Tate was born in Morristown, Tenn., Sept. 15, 1882; received academic and law degrees from the University of Tennessee and began to practice law in 1903. He was judge of the Eleventh Chancery Division of Tennessee from 1918 to 1920. He is a republican.

✦

Robert M. Feustel, president of the Indiana Service Corporation, Fort Wayne, Ind., has been elected president of the Central Indiana Power Company, Indianapolis, Ind. He has been vice-president of the power company for more than a year. Samuel Insull, Jr., Chicago, who has been president, simultaneously was elected vice-chairman.

✦

Edward B. Schoultes, formerly with the Barron G. Collier service, has been engaged as an assistant to C. Melvin Sharp in charge of advertising work for the Washington Railway & Electric Company, Washington, D. C. Before accepting this position with the Washington company, Mr. Schoultes was connected with the H K Advertising Service in Washington.

✦

C. H. Quick, chief clerk of the voluntary relief department of the Interborough Rapid Transit Company, New York, for the past 23 years, has been appointed superintendent of that department to succeed the late Anson T. Berry. As chief clerk, Mr. Quick was Mr. Berry's first assistant. By virtue of his service with the company since Jan. 15, 1907. Mr. Quick is well known throughout the system.

✦

George E. Tebbetts, engineer of structures of the Chicago Rapid Transit Company, Chicago, Ill., was elected president of that company's A.E.R.A., Section No. 6 for the ensuing year at the recent meeting. He succeeds Luke Grant, manager of the publicity department, who served as president during the year just closed.

Fred K. Baker, of Everett, Wash., has been appointed director of the Department of Public Works of Washington, by Governor Hartley. He succeeds Judge J. C. Denney. Mr. Baker served for some months as supervisor of transportation. The department regulates all bus operations within the state and passes on all applications for new lines or extensions.

✦

A. R. Gardner, formerly secretary-manager of the Motor Coach Association of Washington, has resigned as head of the Department of Efficiency of the state, to become state secretary of the Savings and Loan Association.

✦

Augustine A. Bragassa, a clerk in the offices of the Lynchburg Traction & Light Company, Lynchburg, Va., since last July, has been promoted to the ways and structures department of Roanoke Railway & Electric Company. Both the Lynchburg Traction & Light Company and the Roanoke Railway & Electric Company are subsidiaries of the Central Public Service Corporation.

✦

Edgar Hymans, assistant transportation engineer of the Public Utilities Department at Cincinnati, Ohio, has resigned to become traffic manager of Ohio Bus Lines.

✦

Charles J. Heacock, Warsaw, Ind., has been named treasurer of the Winona Interurban Railroad. Mr. Heacock has been office manager of a large machinery manufacturing company of Warsaw for several years.

✦

H. Takada, general passenger agent, **M. Tsukada,** superintendent Sendai division, and **H. Yamawaki,** secretary to the vice-minister of the Japanese government-owned railroads, recently spent three days in inspecting the properties and operations of the Pacific Electric Railway in Los Angeles. The three railway officials are making an extended tour of this country and Europe in an inspection and study of steam and electric railway properties.

✦

Thomas Adams has resigned as the general director of the committee on the regional plan of New York and its environs, but will remain as an adviser to the committee which will undertake to make effective the plans designed to carry out his conception of the future city. The task Mr. Adams took up nearly seven years ago entailed the collection of basic information, the composition of a comprehensive plan which has taken form in the several volumes issued by the committee, and in communicating to the public the nature and importance of the projected changes.

✦

Herbert B. Flowers, president of New Orleans Public Service, Inc., New Orleans, La., has been re-elected chairman of the industrial bureau of the Association of Commerce of New Orleans.

✦

H. Mozley, general manager of Burnley Corporation (England) transport department for about 30 years, is retiring.

✦

A. George W. Brown, who has been research engineer of the Fifth Avenue Coach Company for the past eight years, on March 1 will become automotive engineer for the Borden's Farm Products Company.

Digitized by Google

OBITUARY

C. T. Hutchinson

Charles T. Hutchinson, president of the McGraw-Hill Company of California, died on Feb. 12, at the age of 54. Mr. Hutchinson's active association with McGraw-Hill began in April, 1922, when he came to the company from the Dewey Publishing Company of San Francisco, publishers of the *Mining and Scientific Press*. Prior to this time he had played an active and prominent part in engineering circles on the west coast.

In November, 1922, he was elected vice-president and general manager and a director of the McGraw-Hill Company of California. He also occupied the position of editorial director of the *Journal of Electricity*, now known as *Electrical West*.

On Nov. 22, 1926, he was elected president of the McGraw Hill Company of California. During the last four years Mr. Hutchinson also occupied the important

C. T. Hutchinson

position of chairman of the California Electrical Bureau.

His experience with the Joshua Hendy and the Union Iron Works gave Mr. Hutchinson a knowledge of the technique of engineering that proved invaluable during his successful participation in the publishing of engineering periodicals. To all his work, and to his play, he brought a genial sense of humor of the O. Henry kind; he was courteous, companionable, and capable. Mr. Hutchinson was widely known in literary, scientific and engineering circles, particularly on the Pacific Coast.

✦

C. P. Taft

Charles P. Taft, who died at his home on Pike Street, Cincinnati, Ohio, on Dec. 31 occupied an important place in the life of Cincinnati. His long connection with the local transportation system was fittingly recognized by the directors of the Cincinnati Street Railway in a memorial which recites the fact that while Mr. Taft's financial interest in the company was not very great compared with that in many other enterprizes with which he was identified, he had been associated in one way or another with the local transportation companies for more than a quarter of a century. He was active in the work of reorganizing these companies, and he not only retained his place as director, but kept his interest in their affairs up to the last. The progress in rehabilitating and improving the system was a source of great satisfaction to him, and he was not slow in expressing this satisfaction and giving credit to those who were responsible for doing the work. When he was able to do so, Mr. Taft visited the general offices and different parts of the property, showing his interest at all times.

✦

F. F. Bixby

Fred F. Bixby, manager of the materials department of the American Car & Foundry Company in St. Louis, Mo., died at his home in Webster Groves, Mo., on Jan. 27.

Born in Adrian, Mich., on Aug. 9, 1866, and educated in the public grade and high schools of that city, Mr. Bixby became connected with the purchasing department of the Missouri Pacific Railroad in 1882 and five years later accepted a similar position with the Texas & Pacific Railroad at Dallas, Tex. He returned to St. Louis in 1891 to join the purchasing department of the Wabash Railroad. He was made district manager for the American Car & Foundry Company in 1899 and later was transferred to the materials department.

✦

F. C. Pratt

Francis Cole Pratt, a vice-president of the General Electric Company, died on Jan. 26 in New York at the age of 63. Mr. Pratt was graduated from the Sheffield Scientific School of Yale University in 1888 and had been with the General Electric Company for about twenty years. In December, 1924, having served previously as vice-president in charge of engineering, he was appointed vice-president in charge of manufacturing, to fill the vacancy caused by the resignation of George E. Emmons. With this appointment he also assumed the chairmanship of the manufacturing committee of the General Electric

✦

T. A. McCusker

Terrance A. McCusker of the sales department of the J. G. Brill Company, died suddenly in the Jefferson Hospital, Philadelphia, on Jan. 30, Mr. McCusker, more familiarly known as "Terry" to his many associates in the electric railway industry, was born on May 3, 1874, at Philadelphia. He graduated from Girard College, Philadelphia, in 1891 and joined the Brill sales department as a stenographer on April 3 of that year. During his long connection with the Brill organization, he served in various capacities and positions of responsibility.

He possessed a remarkable memory, being steeped in the knowledge of the industry's history during his long identification with it, and quickly recalling the minutest details pertaining to the development of car design and equipment.

✦

James A. Brock, "Anderson's first citizen," is dead. Mr. Brock was 82 years old, a Civil war veteran and one of the pioneer business men of Anderson, Ind. For more than 50 years he was president of the Bank of Anderson. Mr. Brock played an important part in founding the city's water and light company and the electric railway system.

Thomas Gerehart, long connected with the Interborough Rapid Transit Company, is dead. He was 86 years old. In October, 1867, a few years after he had been honorably discharged from the Federal forces during the Civil War, Mr. Gerehart entered railroad work with the West Side & Yonkers Patented Railway. He served in the capacity of bookkeeper and paymaster and later became a conductor on the original elevated in New York. In 1878 Mr. Gerehart was appointed assistant secretary and treasurer and held this post after the Manhattan Railway acquired control. He served as claim agent of the elevated until he was promoted to be general claim agent of the Interborough Rapid Transit Company in 1905. He served in this post until 1921, when he retired.

✦

Walter Lee Frazier, superintendent of carhouses of the Cincinnati Street Railway, Cincinnati, Ohio, died at his home in Walnut Hills on Jan. 8. Mr. Frazier joined the company on Nov. 9, 1904, as general foreman of all carhouses on the western side of the city. Later he was given full charge of the company's carhouses. The remains were taken to his birthplace in Maryland for burial.

✦

A. H. Henry, formerly track superintendent of the Monroe Street Railway, Monroe, La., now the Monroe Municipal Railway, is dead.

✦

Thomas Worthington, 78 years old, for 35 years an active Wyandotte County Democrat and former chief claim agent for the Metropolitan Street Railway, predecessor of the Kansas City Public Service Company, died on Jan. 24.

✦

Alfred C. Lee, for 26 years in charge of the line work of the Indianapolis & Cincinnati Traction Company and its successor, the Indianapolis & Southeastern Railroad, died in Shelbyville, Ind., recently, at the age of 66. Mr. Lee formerly represented Shelby County in the Indiana Legislature.

✦

John F. Dinkey, 75 years old, railroader and business man, is dead. Mr. Dinkey retired on June 30, 1928, from the office of auditor and treasurer of the Buffalo, Rochester & Pittsburgh Railway. He entered the railroad industry in 1874, joined the B., R. & P. in 1881, and gave to that railroad, through its many vicissitudes, the best years of his life until his retirement. For three years he was connected with the Manhattan Elevated Railway. That was during the formative years of the company following the construction of the elevated lines in New York.

✦

E. L. Sleeper, for fifteen years personal representative of G. J. Kuhrts, president and general manager of the Los Angeles Railway, is dead. Mr. Sleeper was a native of Boston, Mass. A civil engineer by profession, he had been employed on a number of large engineering projects in the East before he went to southern California in 1908. From 1910 to 1913 he was city engineer of Pomona, Cal. In 1913 he became superintendent of construction in the outer harbor at San Pedro, a position he held until he joined the forces of the Los Angeles Railway.

Digitized by Google

INDUSTRY MARKET AND TRADE NEWS

Public Service of New Jersey Places Largest Bus Order

In order to take care of replacements, extensions and new business throughout its territory, Public Service Co-ordinated Transport, Newark, N. J., recently placed what amounts to the largest order for buses ever given by a single company. In the order, which totals 381 buses, are 211 of the gas-electric type, to be used in city service, and 170 of the gas-mechanical type for the long distance intercity routes. The city type buses will provide seats for 40 passengers, while the intercity buses will seat 30 passengers.

Of the total order 338 chassis are to be supplied by the General Motors Truck Company, Public Service building the bodies for this type in their own shops. The Mack Company is to supply ten buses of the city type and two parlor car de luxe buses, and the White Company supplies eleven buses. American Car & Foundry Motors Company's order is for twenty complete Model 40 33-passenger de luxe type buses for service on the Morris County division. These buses are equipped with Hall-Scott 120-hp. motors, are of 240-in. wheelbase, and are provided with a recently developed fresh air system of heating and ventilation. Seats are of the individual bucket type, upholstered in leather.

Features in the new buses will include the elimination of wheelhouse seats, improved ventilation facilities, exterior and interior baggage racks, sound insulator equipment, shock absorbers and balloon tires. Engine horsepower is, on the average, heavier than the present standards on the property.

Twin Coach deliveries during the month include one parlor car to the Milwaukee Electric Railway & Light Company, two 21-passenger urban type coaches to the El Paso Electric Company, and three 21-passenger urban type coaches to the Houston Electric Company. American Car & Foundries Motor Company reports the delivery of one 33-passenger urban type coach to the Poughkeepsie & Wappingers Falls Railway, and one 40-passenger gas-electric coach to the Brooklyn & Queens Transit Corporation.

Denver Tramway Company has received two White Model 65 buses. The White Company has also made delivery of four model 65 six-cylinder buses to the Community Traction Company, of Toledo, Ohio, and one bus of similar model to the Houston Electric Company.

Mack-International Motor Truck Corporation reports delivery of one Model BC 29-passenger city type bus to Denver Tramway Company, one 33-passenger city type bus to Winnipeg Electric Company, and four 29-passenger city type buses to Community Traction Company, of Toledo.

Multiple Coin Turnstile Developed

A new multiple coin device turnstile which will accept 5 and 10-cent coins or tokens through the same slot, then separate and record separately, has been brought out by the H. W. Alexander Company, automatic merchandising engineers, New York. It is now being exhibited at the Ohmer Fare Register Company display rooms, New York.

The turnstile appears of safe, sturdy construction and provides rapid, easy operation. It was designed for traction systems, subways, elevateds, steam railroads, parks, concessions and theaters. It has no electrical connections, hence meets the market demand for inexpensive apparatus to buy and to operate almost everywhere.

The turnstile will soon be in trial operation on one of the New York street cars.

ELECTRIC RAILWAY MATERIAL PRICES—MARCH 1, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	18.00
Lead, cents per lb.	6.25
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	5.50
Tin, Straits, cents per lb.	39.00
Aluminum, 98 to 99 per cent, cents per lb.	24.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	42.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.35
Somerset mine run, f.o.b. mines, net ton	1.70
Pittsburgh mine run, Pittsburgh, net ton	1.50
Franklin, Ill., screenings, f.o.b. mines	1.45
Central, Ill., screenings, f.o.b. mines	.90
Kansas screenings, Kansas City	1.50

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ⅞ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.15
Angle bars, cents per lb.	2.075
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.90
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.40

Hardware—Pittsburgh

Wire nails, base per keg	$2.30
Sheet iron (24 gage), cents per lb.	2.65
Sheet iron, galvanized (24 gage), cents per lb.	3.35
Galvanized barbed wire, cents per lb.	2.95
Galvanized wire, ordinary, cents per lb.	2.90

Waste—New York

Waste, wool, cents per lb.	14.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	11.00
Colored	10.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	14.4
White lead in oil (100 lb. keg), cents per lb.	14.25
Turpentine (bbl. lots), per gal.	0.61
Putty, 100 lb. tins, cents per lb.	5.725

Wire—New York

Copper wire, cents per lb.	19.875
Rubber-covered wire, No. 14, per 1,000 ft.	$6.15
Weatherproof wire base, cents per lb.	18.50

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.85
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	14.75
Light copper, cents per lb.	12.50
Heavy yellow brass, cents per lb.	8.00
Zinc, old scrap, cents per lb.	2.75
Lead, cents per lb. (heavy)	4.75
Steel car axles, Chicago, net ton	$17.00
Cast iron car wheels, Chicago, gross ton	15.50
Rails (short), Chicago, gross ton	19.00
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	8.00

Westinghouse Closes Year with Large Orders

Westinghouse Electric & Manufacturing Company entered the current year with unfilled orders approximating $65,000,000, the largest total since 1921, and more than 40 per cent greater than at the beginning of 1929. On April 1, 1928, or almost two years ago, when the company's accounting was on the fiscal year basis terminating March 31, the backlog of orders amounted to $47,742,204.

Orders booked by Westinghouse since Jan. 1, last, have also shown an upward trend compared with like period of 1929.

Westinghouse completed its best year of operations in 1929 with net income estimated in excess of $26,500,000, after all charges, or about $10 a share on 2,665,315 shares of combined preferred and common stocks outstanding. This would compare with $20,814,940 after charges, or $8.78 a share on 2,370,063 shares of combined stocks issued in 1928.

Orders booked last year were at a new high mark, approximating $240,000,000, an increase of about 24 per cent over the $193,224,000 of bookings in 1928, the previous record year. Sales billed for 1929 will also be at a new figure; they probably amounted to around $217,000,000, against $189,050,302 in 1928.

Fageol Companies Close Successful Year

In the first consolidated statement published by the Fageol Motors Company and the Fageol Motors Sales Company, Oakland, Cal., embracing the operations of the two companies, a net profit, before deduction of federal income tax, of $153,658 is reported for the year ending Dec. 31, 1929. Since this is the first statement issued in consolidated form, comparative figures for previous years are not available. Total sales during the year amounted to $3,971,858.

Ten Double-Deck Buses and 50 New Cars for Baltimore

The United Railways & Electric Company, Baltimore, Md., has ordered twelve additional double-deck buses for use on the Charles Street line. Delivery is expected within the next two months. The company also is negotiating for 50 or more new cars. These it hopes to have ready for use in the fall.

Large Order for Car Heaters

Electric heaters for the 300 subway cars for the New York Board of Transportation have been ordered from the Consolidated Car-Heating Company. The heaters are of the panel type, light weight, double coil. There are to be 28 heaters per car.

Socony Lubricants for B.-M.T.

Contracts were closed on Feb. 1 by the Standard Oil Company, New York, to provide all the lubricating products required for the subway, elevated, surface railways, buses, power stations and shops of the Brooklyn-Manhattan Transit Corporation in Greater New York.

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

Volume 74 New York, April, 1930 *Number 4*

Improvement Plans Go Forward

DETERMINATION on the part of electric railway executives to carry out their full program of expenditures for improvements during 1930 remains unshaken. They believe that there is nothing in the present general business situation to necessitate any curtailment of their new equipment, construction and maintenance budgets. Expenditures planned by the industry for these purposes total more than $371,000,000. This was indicated by the survey appearing in the Annual Statistical Issue of ELECTRIC RAILWAY JOURNAL, published early in January.

But that was three months ago. They have been three months of economic uncertainty. Business trends have been hesitant. Electric railway traffic has declined sharply. To determine what effect, if any, these conditions might have on the improvement plans of the industry, this paper made a telegraphic survey covering railways in most of the principal cities in 27 states and Canada, as well as a considerable number of interurbans. Practically without exception these companies replied that they intend to carry out their program of extensions, betterments and maintenance as originally planned. "No reduction in expenditures contemplated," "See no reason to change our plans," "Our company is carrying out full program of expenditures," are typical of the answers received. Detailed results of the survey are given in an article appearing elsewhere in this issue.

Preliminary steps have already been taken to carry out these improvement plans. Orders for more than 250 new cars have been placed since the first of January and announcement has been made of the prospective purchase of 200 additional cars in the near future. Approximately 500 new buses have been ordered by the electric railways during the past three months, with the purchase of 150 more pending. Activity has been evident also with respect to trackless trolleys. Orders have been placed for 41 of these vehicles, with the purchase of 100 more under consideration. Track construction, of course, is a seasonal activity. The work for this year is only just beginning. Orders placed for track material indicate that the electric railways are practically ready to begin the execution of extensive construction programs. Materials for the maintenance and construction of overhead line and power equipment also have been purchased in volume, indicating that activity in this department will not lag.

Expenditures made during the first three months of this year for new equipment, construction and maintenance represent only a relatively small part of the annual budget. During the next six months improvement plans will be pushed more rapidly. Electric railway men feel entire confidence in the fundamental soundness of the economic situation and in the continuing need for public transportation service. They are going forward with this program of extensions and betterments. This the JOURNAL's survey definitely substantiates.

Transportation Salesmen Who Wear Overalls

WHILE the first contact made by a transportation company's patron is with the operator of the vehicle in which he is riding, an effective merchandising program must go far deeper than that. Important as it is to have neatly dressed, competent and courteous operators, it is equally important to have shop foremen and carhouse employees who measure up to their responsibilities. Train crews may be letter perfect in the performance of their duties and well versed in all the requisites of ride salesmanship, but the effect will be nullified if the cars themselves are dingy, dirty and noisy. Merchandising, in fact, begins in the shops and garage.

Poorly maintained rolling stock prevents successful merchandising in two ways. Cars and buses are the show windows of the local transportation industry. By their appearance, they attract or repel potential customers. Even strangers in a city, though they may not patronize its local transportation system, often gain a lasting impression of that city from the appearance of its street cars. Equally important is the fact that the vehicle operators themselves have little enthusiasm and interest in salesmanship unless they have worth-while service to sell. Just as surely as the craftsman must have proper tools if he is to perform good work, so too must the operator have a clean, well-maintained vehicle if he is to render good service. The shopman in his overalls is a salesman of transportation just as much as is the operator in his brass-buttoned uniform.

Putting Maintenance on a Production Basis

UNIT replacement has been generally accepted in many industries as the most efficient system of equipment maintenance. This system is akin to the mass production methods which have been instrumental in lowering manufacturing costs. Although the electric railway industry as a whole has been slow to adopt this practice the properties where it is followed are convinced of its effectiveness.

By centralizing the overhaul and repair of equipment parts, the unit replacement system results in better work being done at lower cost. On many railways it is customary to do minor overhaul work at the various carhouses whenever inspection discloses the need for it. Costs are higher when work is done in the individual

Digitized by Google

overhaul shop, and the time required for inspection and repair is considerably increased over that required under the unit replacement system. Centralization permits overhauling to be done at a steady rate by trained specialists working at maximum efficiency all the time. Moreover, the installation of modern machinery can be justified when it is kept in steady operation. This in turn results in further economies.

Another advantage of unit replacement is the reduction in the length of time required to overhaul a car. With the old system of bringing the car into the shop, stripping it of its equipment, overhauling each of the individual parts and then reassembling them, a period varying from three to twenty days is required. This represents a long term of inactivity during which the car is earning nothing. With the unit replacement system it is possible to bring in a car for overhauling, replace old parts with repaired parts, and get the vehicle back into service again much more quickly.

Of paramount importance, also, is the encouragement which the unit replacement system gives to preventive maintenance. With this system it is possible to overhaul spare parts at a central point and distribute them among the various operating stations so that worn parts can be replaced at the regular inspection periods. The presence of extra equipment which can be easily subsituted for a suspected part encourages such substitution rather than the policy of "taking a chance" that such a part will last until the next inspection. Other advantages of the unit replacement system worthy of serious consideration are the closer supervision of overhauling work and the keeping of more accurate equipment records.

Perhaps the hesitancy on the part of electric railways to adopt this procedure has been due to the additional investment required to keep on hand the necessary extra equipment. While it is true that the unit replacement system requires at the beginning an additional investment in extra equipment, it permits a substantial reduction in the amount of repairs material which must be kept on hand at the operating stations. Regardless of the matter of investment, however, experience shows that this system is effective in preventing rolling stock failures in service. Undoubtedly the cost of such breakdowns, measured in public good will as well as in actual dollars and cents expenditures, is far greater than the cost of keeping on hand the extra equipment.

Junk Piles—Monuments to Progress

"JUNK is a horrid word," to paraphrase a current advertisement, and a junk pile is seldom good to look at. But, according to no less an authority than Dr. Julius Klein, Assistant Secretary of Commerce, these piles of discarded machinery, of cast-off equipment, are impressive monuments to American progress. They are in sight because progressive managements prefer to have the junk outside the factory instead of inside and in use.

Generally speaking, the progression to the junk pile is accelerated by a desire to have in use only such equipment as will render satisfactory and economical service. Thus obsolescence rather than complete destruction of usefulness is the measure that determines when retirement is desirable—and necessary—if the business is to be conducted economically. Obsolescence indicates progress. It also indicates careful management, for equipment is seldom if ever discarded until an analysis has proved that the move is a wise one.

In the electric railway industry, a survey made by this paper a few years ago showed that 40 per cent of the machine tools in use were 20 or more years old. There is no indication that this proportion has changed materially. Another survey by this paper showed that 34 per cent of the passenger cars were more than 20 years old. Today there is an even greater proportion of old cars. While these pieces of animated junk will function after a fashion, it is self-evident that they cannot do the work of equipment designed today for today's need. Now is the time to build our monuments to progress by consigning the junk to the junk pile, where it belongs.

Interstate Bus Regulation Advanced

WITH the passage of the Parker bill by the House of Representatives on March 24 an important step was taken toward the regulation of interstate bus operations. Legislation on this subject has been under consideration by Congress since 1925, shortly after the United States Supreme Court decided that under the existing law neither the individual states nor any federal agency possessed authority to regulate this form of transportation. The situation created by the absence of regulation has been of direct concern to the electric railways, both from the standpoint of their own operations and those of their competitors. While general agreement has long existed among interstate bus operators that regulation of some sort was desirable, differences of opinion concerning certain details, and opposition from various sources outside the ranks of the operators have resulted in protracted delays.

In its present form the Parker bill empowers the Interstate Commerce Commission to supervise the interstate operation of passenger buses, acting through the state regulatory bodies where not more than three states are involved and with discretionary authority to refer cases to state bodies where more than three states are involved. The authority granted includes regulation of rates and fares and the requirement that the bus lines file liability insurance or indemnity bonds.

Buses are to operate under certificates of convenience and necessity, with regular routes and fixed termini. Operation of interstate buses on March 1, 1930, is to be considered *prima facie* evidence of convenience and necessity. This date is a change from that originally fixed in the bill, which was Jan. 1, 1930.

Some opposition was voiced to the passage of the bill on the ground that it would tend to stifle competition and create a monopoly. Obviously this argument has little merit as practically all states have laws governing intrastate transportation of persons by motor carriers, and the enactment of the proposed legislation is merely an extension of this principle to a type of operation which has heretofore been without adequate regulation. With a view to overcoming this objection, however, an amendment was made to the bill on the floor of the House providing that no consolidation, merger or acquisition of control should be approved if more than one of the groups involved was directly or indirectly engaged in railroad transportation.

The next step will be the consideration of the Parker bill by the commerce committee of the Senate. It is expected that the committee will conduct hearings before making any recommendations. While this will necessarily result in some additional delay it is to be hoped for the stability of the bus industry that favorable action will be taken at this session.

Digitized by Google

Hidden Assets

FEW, indeed, of the millions of passengers who ride the electric railway cars every day have any realization of the far-reaching organization required to provide the safe and dependable service which they use. They would be amazed to know that on a property of average size, more than 8,000 different items must be kept constantly on hand in the storeroom in order to assure the reliability of the service. The amount of money tied up in these materials and supplies averages nearly half a million dollars, or about 5 per cent of the annual gross receipts. For the industry as a whole, a survey published elsewhere in this issue shows that there is a total investment of approximately $72,500,000 in materials and supplies kept in stock.

In this survey figures were secured from 42 electric railways of varying sizes in the United States and Canada, representing in the aggregate about one-quarter of the entire industry. Considerable variation was shown between the large and small companies, and also between different companies of the same approximate size. In general, however, the reports showed remarkable uniformity, and the averages of the large, medium-size and small groups, furnish a series of convenient yardsticks by which to measure the conditions on an individual property.

The survey also showed that there is a decided trend today toward buying in small lots at frequent intervals rather than in occasional large quantities. Most of the railways are following this practice, but not overlooking the price inducements offered for quantity purchases. The general rule appears to be that smaller amounts are bought unless the savings accruing from quantity purchase exceed the interest on the extra investment.

In the past few years standardization has been responsible for many substantial reductions in the quantity of materials and supplies kept in stock. This has been done by co-operative effort of the industry as a whole, and also by standardization on individual properties. Further progress in this direction is to be expected, but despite everything that can be done, the materials and supplies kept on hand to insure the continuity of service will always remain a "hidden asset" of enormous importance.

Electrification Proceeding on Its Merits

INDICATIVE of the modern viewpoint in transportation circles which looks toward making the maximum use of the plant is the present activity in the field of steam railroad electrification. Thirty years ago, when electrification of main trunk lines was first proposed, the principal claim in its favor was economy of power supply as compared with steam. While the arguments advanced were valid enough, comparatively few installations were made for this reason. A more important factor was the impracticability of using steam in special locations, such as metropolitan terminals or tunnels. A number of years later, when the terminal installations had given ample proof that electric power was not only able to replace steam, but under certain conditions was doing things that steam never could accomplish, more roads began giving serious consideration to electrification.

Today the use of electric power is being extended rapidly. The Pennsylvania, a pioneer in electrification, will within a few years have the most comprehensive heavy installation in the world. The suburban electrifications of the Lackawanna in New Jersey and the Reading in Philadelphia are looked on merely as forerunners of much greater projects. Even the Cleveland terminal electrification, now about to start operation, appears to be only a step in the ultimate conversion of a large section of the New York Central.

Two of these new installations, the Pennsylvania, which is a heavy trunk line system, and the Reading, which for the present comprises suburban service only, are being made with 11,000-volt single-phase alternating current. The other two are being made with 3,000-volt direct current. The Cleveland Union terminal electrification will handle heavy trains while the Lackawanna for the time being will use multiple-unit suburban trains only. Thus it appears that the sponsors of both systems consider them entirely suitable for practically all classes of electrification. It is quite significant that there are so few limitations to the type of supply that will give satisfactory service. To some extent, however, this wide choice has tended to retard rather than help the progress of electrification both in this country and abroad.

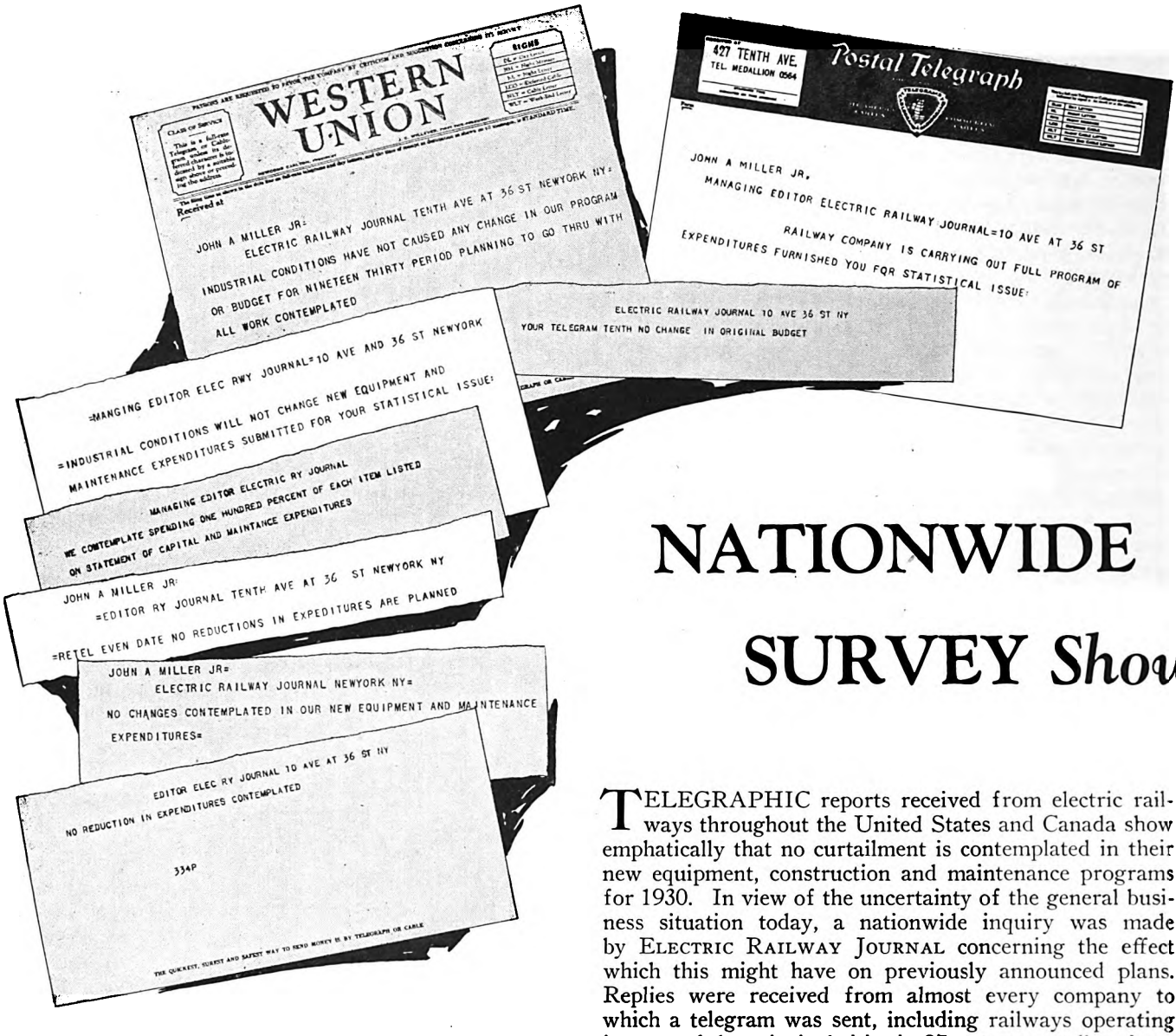
It is needless to recount the advantages of electricity. They are now well known to railroad men who have been following developments. With increasing use new advantages are being discovered which scarcely could have been predicted before any comprehensive installations had been completed. Accordingly the new electric roads are being watched with great interest. Their success is a foregone conclusion.

A Professor Speaks

IDEAS that have long been held by electric railway men received new emphasis from the clear and forceful presentation made by Prof. Winthrop M. Daniels at a recent meeting of the New England Street Railway Club. Problems of transportation have occupied the attention of Professor Daniels for many years. His conclusions deserve consideration. When, speaking of street traffic conditions, he said that "we are now engaged in the almost hopeless task of trying to force a 3-in. stream through a ½-in. nozzle," he created a picture the vividness and accuracy of which must appeal to every thinking person. Changing the metaphor, he pointed out that the arteries of local traffic in central shopping and business districts are suffering from high blood pressure. His listing of schemes which are merely palliatives, or which involve prohibitive expense, was extremely helpful.

Though there is a "no man's land" where competitive rivalry is acute between the private automobile and the public transportation agency, he believes that there is a definite core of traffic which can be handled only by the latter. In congested districts electric railway traffic represents the major movement and should receive dominant consideration. The convenience of the few as represented by parking and similar uneconomic uses of street space must give way to the convenience of the many as represented by the traffic on public transportation vehicles. At present the satisfactory operation of the electric railways is being seriously impaired by congestion. The railways cannot afford to sit back in the hope that this difficulty will be self-corrective. Only when they militantly, but without asperity, insist that their right is paramount, will they be able to operate satisfactorily. This they must do not in their own interest alone, but in the interest of the public as a whole.

Digitized by Google



NATIONWIDE SURVEY *Shows*

Typical Statements Concerning Improvement Plans for 1930

No changes in budget figures. Full expenditures expected.

Industrial conditions will not change new equipment and maintenance expenditures.

No reductions in expenditures are planned.

Have made no change in budgeted amounts for new equipment and maintenance expenditures.

No change on our property.

We do not anticipate any change in our budget for 1930 on account of industrial conditions.

See no reason to change our plans.

No change contemplated in our new equipment and maintenance expenditures.

Present industrial conditions will not affect contemplated expenditures for new equipment and maintenance.

There has been no change in our contemplated budget for 1930.

We do not anticipate any change in new equipment and maintenance expenditures.

No reduction in expenditures contemplated.

TELEGRAPHIC reports received from electric railways throughout the United States and Canada show emphatically that no curtailment is contemplated in their new equipment, construction and maintenance programs for 1930. In view of the uncertainty of the general business situation today, a nationwide inquiry was made by ELECTRIC RAILWAY JOURNAL concerning the effect which this might have on previously announced plans. Replies were received from almost every company to which a telegram was sent, including railways operating in most of the principal cities in 27 states, as well as from a considerable number of interurban lines. The territory covered extends from Maine to California and from Canada to the Gulf of Mexico, with intervening areas covered approximately in proportion to the extent of electric railway operations. Practically without exception these railways state that they intend to carry out the full program of improvements specified in the confidential budget figures submitted last December for the Annual Statistical Issue of this paper. The wide geographical distribution of the railways replying to the inquiry, as well as the variety of business and industrial conditions existing in the territories they serve, assures the reliability of their reports as an index of what may be expected during the year.

Typical of the spirit of the replies is the statement of J. N. Shannahan, president Omaha & Council Bluffs Street Railway and chairman of the Advisory Council American Electric Railway Association. The telegram from Mr. Shannahan reads, "No change in plans submitted for your Annual Statistical Number. We will adhere to those plans during the year." From A. G. Neal, vice-president and comptroller Washington Railway & Electric Company, comes the statement "We contemplate spending 100 per cent of each item listed on statement of capital and maintenance expenditures." The president of a large railway in the East says "Our company is carrying out a full program of

Digitized by Google

expenditures furnished you for Statistical Issue." Other typical replies are presented in an accompanying panel. From these answers it is clearly evident that the electric railways are planning to adhere to the previously reported budget of construction and maintenance expenditures totaling approximately $371,000,000.

A general summary of the plans of the industry for 1930, as presented in the Statistical Issue of this paper is repeated herewith.

Only three companies replying to the JOURNAL inquiry are considering any curtailment of expenditures. One of these, located in an industrial territory on the Atlantic seaboard, believes it may be necessary to reduce expenditures 5 to 10 per cent if industrial conditions do not improve. Another is considering a curtailment of construction and maintenance expenditures ranging from 10 to 20 per cent. The third plans no change in its construction program but may adjust its maintenance budget to meet the decrease which has occurred in the number of revenue passengers carried.

Electric Railway New Equipment, Construction and Maintenance Budget for 1930

	New Plant and Equipment	Maintenance Materials	Maintenance Labor	Total
Way and structures ..	$88,400,000	$35,790,000	$51,360,000	$175,550,000
Cars	31,800,000	36,520,000	50,200,000	118,520,000
Buses	19,900,000	19,650,000	12,470,000	52,020,000
Power equipment....	8,950,000	10,520,000	5,660,000	25,130,000
Total	$149,050,000	$102,480,000	$119,690,000	$371,220,000

Electric Railways Proceeding with

Full Budget Program

New equipment, construction and maintenance expenditures to be made during 1930 in accordance with original plans. Total remains at $371,000,000 despite uncertainty of present business situation

By
JOHN A. MILLER, Jr.
Managing Editor
Electric Railway Journal

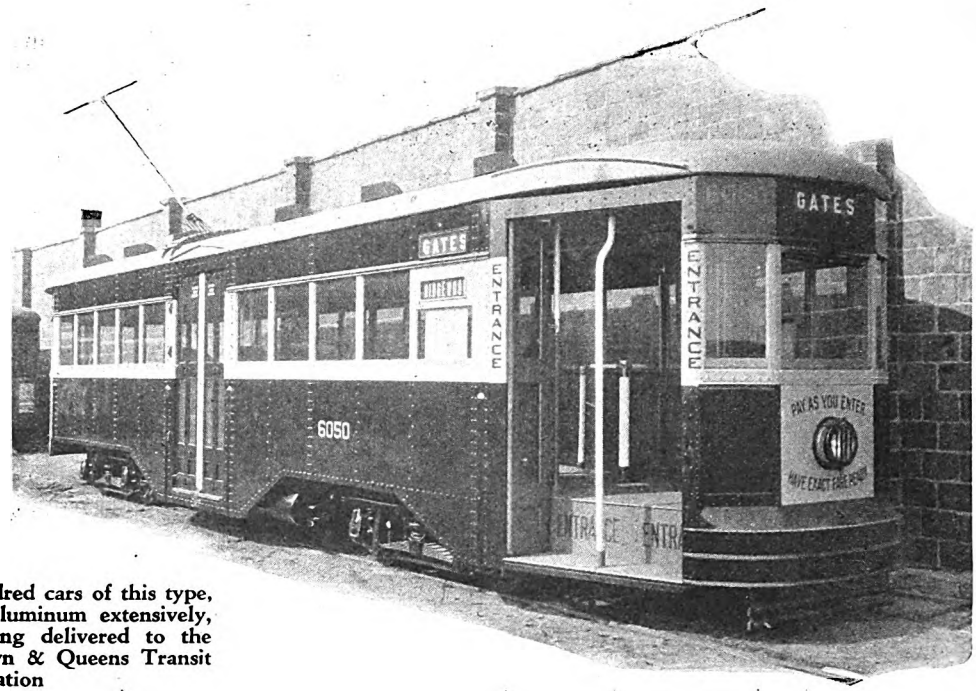
To offset these possible reductions a number of other railways now plan to make larger expenditures in 1930 than were contemplated when figures were submitted for the Statistical Issue of the JOURNAL. Of particular interest is the statement of Lucius S. Storrs, executive chairman United Railways & Electric Company of Baltimore: "The credit of this company has been so far improved that a complete rehabilitation is in view and we have decided to materially increase our budget for new expenditures in the matter of cars and buses." In Detroit, General Manager Del Smith expects that the additional revenue derived from increased fares will permit the Department of Street Railways to add approximately 200 units of rolling stock to present equipment this year, as well as to make numerous other improvements not contemplated when budget figures were submitted. According to D. W. Harvey, general manager Toronto Transportation Commission, "Estimated new equipment and maintenance expenditures will be adhered to, with the exception that a greater amount will be expended for new buses." The Regina Municipal Railway has increased its way and structures budget 50 per cent. Other companies have indicated the possibility of making increases in improvement expenditures similar to those already mentioned.

Among the reports received, a number are particularly encouraging. Richard Meriweather, general manager Dallas Railway & Terminal Company states, "Our business shows slightly upward trend as compared with 1929." In the opinion of N. E. Drexler, division manager Virginia Public Service Company, the business outlook is good and is "already showing up better than last year." According to M. H. Frank, railway manager Wisconsin Power & Light Company, "We are proceeding as originally reported. Expect good year." From Cincinnati, J. B. Stewart, Jr., wires, "No change has been made in new equipment and maintenance expenditure budget. With opening up of outside construction season it is expected that conditions will more nearly approach normal and no cut in budget will be necessary."

Industrial conditions have not caused any change in the program of the Chicago, North Shore & Milwaukee Railroad, according to J. R. Blackhall, general manager. The company is planning to go through with all work as contemplated. He states that general conditions are beginning to show some improvement.

Increased traffic on the lines of the Montreal Tramways is reported by Col. J. E. Hutcheson, vice-president in charge of operation. He says that while curtailment has taken place in some lines of industry with a consequent increase in unemployment at this season, street railway riding has increased 3.66 per cent since the beginning of the year. D. W. Houston, general superintendent Municipal Railway of Regina, Saskatchewan, estimates that passenger revenue in 1930 will be about 10 per cent higher than in 1929.

Digitized by Google



A hundred cars of this type, using aluminum extensively, are being delivered to the Brooklyn & Queens Transit Corporation

Aluminum

Gaining in Favor

Experience with many vehicles built largely of aluminum alloys has proved the economic value of this metal, from the standpoint of both operation and maintenance

RADICAL changes in design during the past few years have resulted in the development of electric railway cars which are very different from those of a decade ago. General appearance has been greatly improved. Riding qualities have been bettered. Much attention has been given to interior design and appointments. Means have been found to reduce noise and to increase the smoothness of operation. Higher rates of acceleration and braking have been attained. And last, but not least, improvements in design have produced substantial economies in operation. An important element in this development has been the reduction in weight made possible by the extensive use of aluminum and its alloys.

Although the use of aluminum in car construction dates back to 1904, when the Interborough Rapid Transit Company and the Chicago City Railway used the metal for several parts, and to 1905, when the J. G. Brill Company used aluminum sheets for the headlining of cars for the Manila Electric Railroad & Lighting Corporation, experimentation on a large scale did not begin until 1923. In that year the Illinois Central Railroad built a number of cars for suburban electrified service, using aluminum extensively. From that period forward the use of aluminum alloys in car construction became more and more frequent. Electric railways, recognizing the advantages of reducing car weight, introduced the lighter metal in a number of sample cars and later in larger orders. In an accompanying table are listed a large number of cars that have been built of aluminum, and others that have used this metal to a considerable extent. Several electric railways have designated that certain parts shall in the future be built of aluminum.

In the construction of buses, too, aluminum has been used for a number of years. Several manufacturers have used aluminum panels for a long time, as well as miscellaneous aluminum castings. It is interesting to note, also, that aluminum has gained a strong foothold in Europe in the construction of both street cars and buses. As early as 1911, Zurich, Switzerland, used aluminum for car panels, roof members and fittings.

This extensive development of aluminum alloys has come about as a result of their many advantages. Outstanding among the points in their favor are strength, light weight, ability to absorb impact loads—making for greater safety, non-corrosive qualities and economical maintenance.

Aluminum alloys have been developed which have

Digitized by Google

about the same physical properties as mild structural steel, except that the modulus of elasticity is about 10,000,000 instead of 30,000,000 for steel and the coefficient of expansion is about twice that of steel. Through the process of heat treating it is possible to obtain aluminum alloy members comparable in strength with steel members of equal size. The Aluminum Company of America has developed alloys to be used for various purposes, five of which are particularly suitable for electric railway car construction. The strongest alloys are known as 17 ST and 25 ST and have physical properties similar to mild steel. Their tensile strength is from 55,000 to 63,000 lb. per sq.in., their yield point from 30,000 to 40,000 lb. per sq.in. and their elongation from 25 to 18 per cent. They are used for all strength members, including structural shapes, side girder sheets, letterboards, anti-climbers, coupler bars, etc. Another alloy used rather extensively is 51 ST, also heat treated, and having a tensile strength of from 45,000 to 50,000 lb. per sq.in., a yield point from 30,000 to 40,000 lb. per sq.in. and an elongation of 18 to 10 per cent. It is used for some interior finish, seat frames and trolley poles.

By

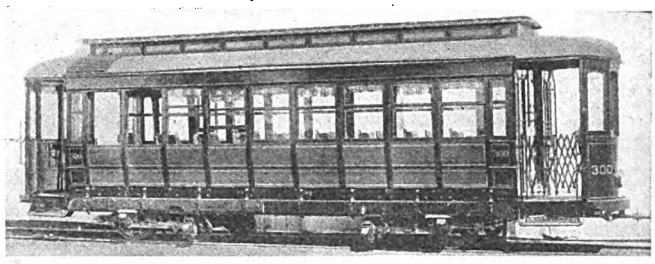
CLIFFORD A. FAUST

Assistant Editor

Electric Railway Journal

for Car Construction

The alloy used for interior sheets, bulkheads, moldings, trim, sign boxes, conduits, cable ducts and other parts which do not require the greater strength of the other alloys is 3 S, with a tensile strength of 20,000 to 25,000 lb. per sq.in., a yield point from 15,000 to 20,000 lb. per sq.in. and an elongation of 20 to 3 per cent. The fifth alloy used is 195 HT, an aluminum casting alloy, heat treated after casting to obtain the desired mechanical properties. These vary upon the heat treatment process administered, the tensile strength varying between 28,000 and 50,000 lb. per sq.in., the yield point between 13,000 and 29,000 lb. per sq.in., and the elongation between 12 and 0 per cent. It is used for trolley bases and harps, fender parts, drawbar anchorages and other similar parts requiring strength and ductility.



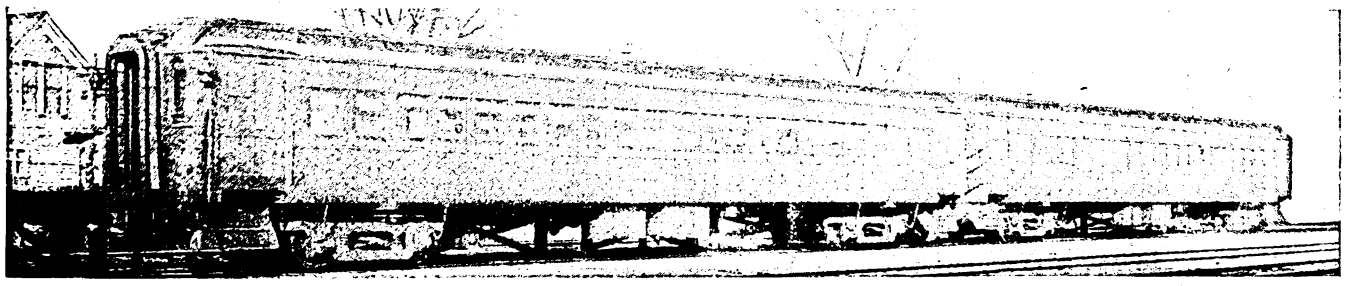
From the vintage of 1905—a car for Manila, using aluminum to withstand the ravages of "white ants"

Although as strong as steel, most aluminum structures weigh only about half as much. In parts where aluminum is used—the underframe, the body, the trucks, the motors and control and accessories—it has been found possible to obtain large reductions in weight. As will be seen in an accompanying table, savings in weight of 13,150 lb. have been made on some cars. In another table the structural members and equipment made of aluminum in the Cleveland Railway car are listed.

Among the more important results of light weight are less power consumption, satisfactory performance of smaller motors and other parts, higher acceleration, braking and running speed, less wear on the track structure, reduced wear of brakes and other parts, less strain on the framing, greater safety, better performance, reduction of unsprung weight of trucks and less noise.

Numerous tests have been made of power savings, resulting from lighter weight. All have shown very substantial reductions. One company reported savings varying from 15.7 per cent with a 23.1 per cent reduction in weight, to 46.2 per cent with a 33.3 per cent reduction in weight. By decreasing the weight of a car it is possible to use smaller motors with considerably less total rating, but which have a higher rating per pound of car. Similarly, many other parts, such as the controller and brake equipment, can be made smaller. Starting with higher acceleration, braking and running speed, made possible by lighter weight, a cycle is set up which includes fewer cars to maintain the same schedule, less power, fewer men, lower investment, etc.

The volume and cost of track work depends to a large extent upon the weight of the rolling stock operated. Light-weight cars can materially reduce the cost of track maintenance by subjecting the track to less wear. Because of the high accelerating and braking rates it is easier for an operator to handle a lighter vehicle. Consequently, these cars are usually handled much more efficiently and with greater safety. Less vibration and



The Illinois Central Railroad pioneered the use of strong aluminum alloys. The two-car train above, one of the first designed, appeared in 1923

Digitized by Google

Equipment in Which Aluminum Has Been Used, with Weight Data

Company and City	Equipment—Number and Type	Manufacturer	Date Equipment was Placed in Service	What Parts of the Vehicle are Aluminum
Interborough Rapid Transit Co. New York, N. Y.	300 subway motor cars and trailers	American Car & Foundry Co.	Oct. 27, 1904	Interior finish, all moldings for finish, hand rail, brackets and wiring molding. Waincoting surface between seats, end interior panels, window panels and headlinings faced with aluminum
Chicago City Ry., Chicago, Ill.	200 semi-convertible double-truck cars	J. G. Brill Co.	1905	Air pipe, hand rails and fittings
Manila Electric Co., then Manila Electric Railroad & Lighting Corp., Manila, P. I.	15 full-convertible double-truck cars	J. G. Brill Co.	Aug., 1905	Sheet for headlining and ceilings
Illinois Central R. R., Chicago, Ill.	25 trailers 130 motor cars 85 trailers 10 motor cars—10 trailers	Pullman Car & Mfg. Co. Pullman Car & Mfg. Co. Standard Steel Car Co. Pullman Car & Mfg. Co.	1923 March, 1926 March, 1926 1928	Roof sheets, interior finish, doors, conduit, fittings, junction boxes and smaller parts
Pennsylvania R. R., Philadelphia, Pa.	8 suburban multiple-unit cars	Pennsylvania R. R.	1925	All of super structure—posts, carlins, sheets, bulkheads, doors, etc.
Chicago & North Western Ry., Chicago, Ill.	120 cars for suburban service	Standard Steel Car Co. Pullman Car & Mfg. Co. American Car & Foundry Co.	1927	All sheets above underframe
Cleveland Ry., Cleveland, Ohio	1 double-truck city car	Cleveland Ry.	Dec. 2, 1926	Body, underf ame and trucks
Pittsburgh Rys., Pittsburgh, Pa.	1 pair trucks	Pittsburgh Rys.	1926	All except wheels, axles, springs and working parts
Springfield Street Ry., Springfield, Mass.	1 double-truck city car	Wason Mfg. Co.	April 14,1927	Side members, letterboard, belt rail and body bolsters
Montreal Tramways, Montreal, Que., Canada	10 two-man city cars 40 of same type 30 of same type	Canadian Car & Foundry Co.	1927 1927 1928	Framing and exterior sheathing Exterior sheathing Exterior sheathing
Chicago & Joliet Electric Ry., Joliet, Ill.	1 double-truck city car	Cummings Car & Coach Co.	Nov., 1927	Body and underframe
St. Louis Public Service Co., then United Railways of St. Louis, St. Louis, Mo.	1 double-truck city car	United Rys. of St. Louis	Dec., 1927	Body and underframe
Twin City Rapid Transit Co. Minneapolis, Minn.	25 city cars	Twin City Rapid Transit Co.	Dec., 1927	Sheets, posts and carlins. Use now standard except underframes
Cincinnati Street Ry., Cincinnati, Ohio	1 pair archbar trucks	Cincinnati Car Corp.	March, 1928	All except wheels, axles, springs and working parts
Utah Light & Traction Co. Salt Lake City, Utah.	11 Versare electric coaches 7 Versare electric coaches	Versare Corp. Cincinnati Car Corp.	Sept. 9, 1928 Dec. 4, 1929	All except two underframe members
Delaware Electric Power Co. Wilmington, Del.	10 double-truck city cars 10 of same type 12 of same type	J. G. Brill Co.	Dec. 4, 1928 1929 Not delivered	Sheeting, seats and miscellaneous parts
Calgary Municipal Ry. Calgary, Alta., Canada	3 one-man city cars 6 of same type	Canadian Car & Foundry Co.	1928 1929	Exterior sheathing
Pittsburgh Rys., Pittsburgh, Pa.	1 double-truck suburban car	Osgood-Bradley Car Co., Trucks by Timken-Detroit Axle Co.	June, 1929	Body and underframe. Trucks all except wheels, axles and springs
J. G. Brill Co. Philadelphia, Pa.	1 experimental trackless trolley	American Car Co.	June, 1929	Body and underframe
Dept. of Street Rys., Detroit, Mich.	1 double-truck city car	Dept. of Street Rys.	July, 1929	Castings, posts and miscellaneous parts
Northwestern Pacific R.R., San Francisco, Cal.	5 interurban motor cars 5 interurban trailers 5 motor cars of same type 5 trailers of same type	St. Louis Car Co.	Sept., 1929 Not delivered	Roofs, conduit, seats and interior finish
Louisville Ry., Louisville, Ky.	1 double-truck city car	Cincinnati Car Corp.	Sept., 1929	Body, underframe and trucks
United Traction Co., Albany, N. Y.	1 double-truck city car	Cincinnati Car Corp.	Sept., 1929	Body and underframe
Third Avenue Ry., New York, N. Y.	1 four-wheel double-end city car	J. G. Brill Co.	Sept., 1929	Body, underframe and parts of the truck
British Columbia Electric Ry. Vancouver, B. C., Canada	15 one-man, two-man cars	Canadian Car & Foundry Co.	Nov., 1929	Exterior sheathing
St. Louis Public Service Co., St. Louis, Mo	1 double-truck city car	St. Louis Public Service Co.	Dec., 1929	Body and underframe
Monongahela West Penn Public Service Co. Fairmont, W. Va.	3 double-truck cars	G. C. Kuhlman Car Co.	1929	Sheeting, air compressors and miscellaneous parts
Youngstown Municipal Ry. Youngstown, Ohio	13 city cars	G. C. Kuhlman Car Co.	Being delivered	Sheets and miscellaneous parts
Chicago & Joliet Electric Ry., Joliet, Ill.	1 four-wheel car	Cummings Car & Coach Co.	March, 1930	Body and underframe
Delaware, Lackawanna & Western R. R. Hoboken, N. J.	141 motor cars for suburban service	American Car & Foundry Co.	Not delivered	All sheets except outside side sheets
Brooklyn & Queens Transit Corp. Brooklyn, N. Y.	100 double-truck city cars	Osgood-Bradley Car Co., (50) J. G. Brill Co. (50)	Being delivered	Interior panels, headlining and miscellaneous parts
Board of Transportation, New York, N. Y.	300 subway cars	American Car & Foundry Co.	Not delivered	Seats, doors, door control, miscellaneous parts and all sheet except outside sheeting

Aluminum was used for car construction as early as 1904. In that year and the one following, three companies adopted the lighter metal for sizable orders. Experimentation on a large scale, however, began in 1923, when the Illinois Central incorporated strong alloys in the design of several suburban cars.

During the latter part of 1926 the Cleveland Railway completed the first all-aluminum street car. In 1927 cars were built in Springfield, Montreal, Joliet, St. Louis and Minneapolis.

Digitized by Google

and Other Pertinent Information

Weight of Aluminum Used in Lbs.	Total Weight of Vehicle in Lbs.	Weight Saved in Lbs.	Estimated Net Additional Cost of Aluminum per Pound of Weight Saved, in Cents	Weight per Seated Passenger in Lbs.	For Detailed Description Refer to the Issue of
.....	Live Load 88,000 motor car 66,000 trailer	.....	.....	1,620 motor car 1,180 trailer	Oct. 8, 1904 March 4, 1905
.....	52,000	.....	.....	1,182	April 8, 1905 Sept. 16, 1905
.....	.....	.....	.....	.....	April 29, 1905 Aug. 12, 1905
4,985 average	88,700 trailers 140,000 motor cars	8,958 average	22	.....	Nov. 10, 1923 Feb. 7, 1925 Dec. 31, 1927
8,636	111,300	13,150	36	.....	July 11, 1925
3,600	99,600	7,000	20	1,015	Jan. 8, 1927
6,647	30,300	12,901	20	618	Dec. 4, 1926 April 9, 1927
518 per truck	1,100 per truck	856 per truck	25.3	.....	.....
735	23,450	.....	.....	521	March 26, 1927 May 14, 1927
2,275 650 650	33,400 35,900 34,700	3,700 1,200 1,200	22 22 22	759 817 789	Sept. 3, 1927 Dec. 10, 1927
10,000	23,722	13,500	20	474	Dec. 17, 1927
3,697	32,000	5,332	35.9	542	Dec. 24, 1927
1,372	27,670	2,618	17.3	553	Nov. 26, 1927 March 31, 1928
450	3,668	650	22.3	.....	.....
.....	16,000	.....	.....	372	Sept. 8, 1928 Feb. 9, 1929
.....	36,640	.....	.....	833	Sept. 22, 1928 Dec. 15, 1928
700	37,800	1,330	.....	713	Sept. 15, 1928 Jan. 12, 1929
3,325	25,200	7,863	19.4	600	July, 1929 Nov., 1929
1,595	14,500	2,282	24.1	483	Aug., 1929
.....	32,500	4,000	.....	625	Aug., 1929 Nov., 1929
3,579 motor cars 3,226 trailers	110,000 79,000	6,650 6,049	17.6 average	1,122 motor cars 767 trailers	March 9, 1929
2,300	29,150	2,500	40	550	June, 1929
2,300	32,450	2,500	40	737	Nov., 1929 Feb., 1930
.....	27,000	3,000	.....	530	Oct., 1929 Nov., 1929
650	39,000	1,330	.....	780	Jan., 1930
4,084	36,180	7,350	19.7	584	Feb., 1930
.....	35,000	.....	.....	729	Jan., 1930
.....	28,000	.....	.....	622	Jan., 1930
.....	.....	.....	.....	.....	.....
.....	148,000	.....	.....	1,762	Aug., 1929
.....	34,000	.....	.....	630	Sept. 14, 1929
.....	85,000	.....	.....	1,417	Nov., 1929

The great number built in 1928 and 1929, listed in the above table with several now on order, indicates that aluminum as a metal for car construction is beyond the pioneering stage and well advanced in the period of general acceptance by the industry.

attendant noise result with the use of aluminum because of its physical nature.

Greater safety results from the ability of aluminum to absorb impact loads without distortion. In the event of a severe impact, when the yield point of the metal is exceeded there is a tendency for the structure to hold together. I-beams, webs of channels, built-up girders and gusset plates bend but do not tear, as most grades of structural steel will do under similar strains. The

Equipment and Structural Members of the Cleveland Railway Car, Made of Aluminum

Body
All side and end plates
Steps, front and center
Hand brake levers
Sash rail
Post angles
Door frame
Head lining strips
Conduit
Carlins
Letterboard
Junction box
Bulkhead

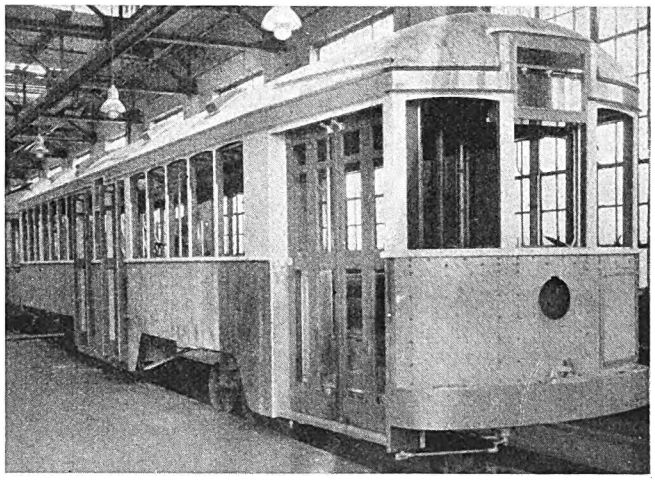
Underframe
Cross channels
Coupler bar attachment to underframe
Front platform stem
Body bolster
Gusset plates
Radial bar

Trucks
Side bars
Pedestal gibs and tie bars
Horizontal lever
Truck bolsters
Side bearing housings
Motor supports
Brake shoe holders
Top brake rods

Motors
Gear cases
Pinion and commutator end housings
Pinion and commutator end axle caps

Controller
Back frame

Accessory Parts
Bumper
Fare box
Seat pedestals and framework
Draw bar
Heater duct
Door shafts
Window locks
Conductor seat
Ventilators
Window guards
Brake cylinder parts
Front draw head
Fare box stand
Stanchions
Seat grab handles
Sign box
Sand box
Head light
Trolley base
Fender
Trolley catchers
Window screens
Coupler
Gong



During 1926, the Cleveland Railway built the first street car of aluminum, using this metal not only for the body and underframe, but also for the trucks

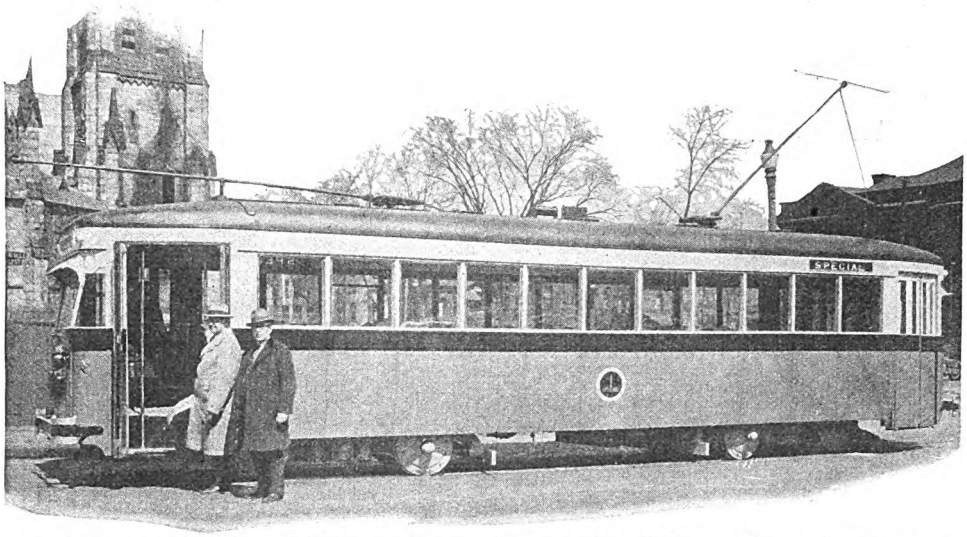
low modulus of elasticity is probably responsible for this characteristic.

Another distinct advantage of aluminum is its ability to withstand atmospheric corrosion. Because of this resistance there is little tendency for paint to peel off, as it does quite frequently on steel. Tests conducted on cars long in service show no signs of corrosion.

During the development of aluminum for street cars it became apparent that it was desirable to isolate the motor ground circuits to prevent leakage of current through joints of aluminum and steel. One instance was encountered where a divided ground circuit caused electrolytic corrosion of an aluminum joint fastened with steel rivets. This was entirely corrected by proper grounding.

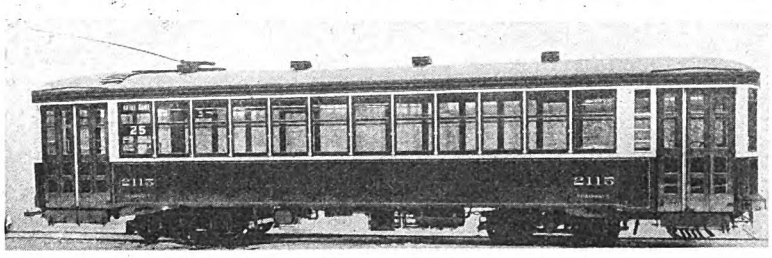
From the standpoint of maintenance, aluminum alloys have numerous advantages. Chief among these is the ease with which the metal can be worked. A portable pyrometer for measuring heat intensity is necessary in a shop for the proper handling of aluminum alloys, and it

Digitized by Google



Early in 1927 the Springfield Street Railway introduced its light-weight experimental car, with side members, letterboard and other parts of aluminum

is desirable to have a pyrometer-controlled electric furnace, but no other equipment need be purchased. Punching, shearing, machining and riveting are all performed with the same tools that are used for steel. Bending cold must be watched and the particular qualities of the various grades and tempers of aluminum alloys known. Temperature control is essential for hot bending or forming, this process requiring a special technique.



The lighter metal was first used in Canada by the Montreal Tramways. A total of 80 cars with aluminum are now in service on this property

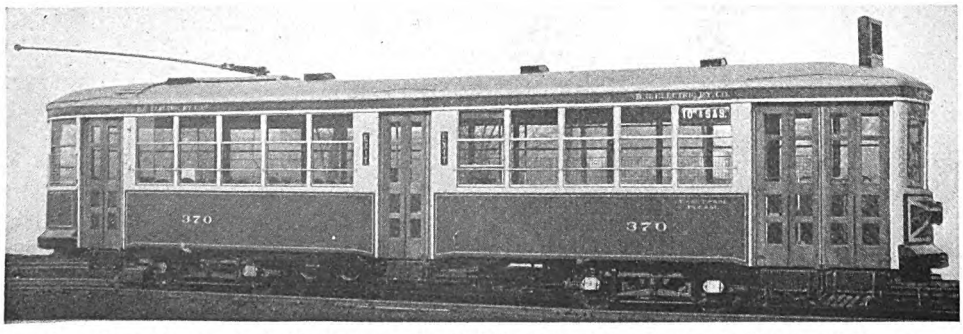
Aluminum alloys can be welded with an oxy-acetylene torch and at the present time an electric welding apparatus is being developed. Although aluminum parts for replacement are more expensive than steel ones, this cost can be largely offset by the high salvage value.

Perhaps the greatest deterrent to the more general adoption of aluminum alloys for car construction has been the higher cost of this material. The alloys used for car construction cost from 28 to 45 cents per pound or 9 to 15 cents per square foot, as compared with 3 to 6 cents for steel. However, the smaller weight of material required, the power savings possible, the lower first cost of motors and other parts and the lower maintenance cost of cars and track, largely offset the extra original cost. In terms of extra cost per pound of weight saved, 20 cents can be taken for an average. In the accompanying table listing cars using aluminum, the estimated additional costs of aluminum per pound of weight saved are shown. As will be noted, the figures vary from 17.3 cents to 40 cents. Since the net savings for those cars which were ordered in quantity vary from 15.3 cents to 22 cents, it is reasonable to assume the figure of 20 cents as representative. It has been further estimated that the cost of hauling dead weight is from 5 to 10 cents per pound per year for electric railway cars in city service and 3.5 cents on cars in heavy suburban service. Assuming the figure of 5 cents as the average cost, it appears that aluminum will pay for itself in a period of four years.

Another important factor bearing on the cost is the lower initial investment for motors and other parts which can be made smaller. It has also been pointed out that if lighter equipment were adopted generally it would permit the use of a lighter track structure, which would materially lower the capital investment in this part of the system. This would be true also for the generating and transmission system.

At the time the first cars were made of aluminum practically all of the parts were made individually, involving a heavy extra unit cost. In addition, the pioneer designers of aluminum cars expended large amounts in preparing their designs and in carrying out other experimental work. Naturally, the costs of the first vehicles were much in excess of the old standard cars. As the car manufacturers become more and more accustomed to the fabrication of this metal and get the proper machinery and training for using it, the costs will continue to go down. Moreover, when aluminum cars are built in quantity, it is likely that the total cost of a car will be no higher than for a standard steel car.

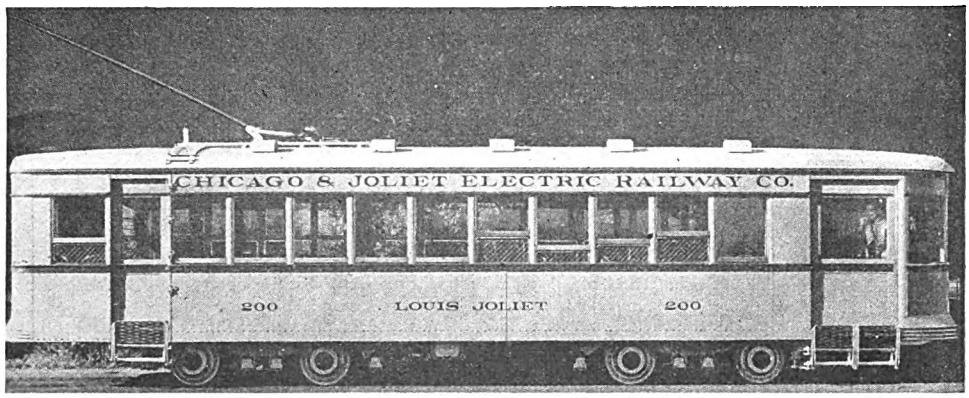
As has been pointed out, aluminum was used in the construction of cars as early as 1904. In that year and the year following three companies received cars using aluminum to some extent. They were the Chicago City Railway, the Interborough Rapid Transit Company and the Manila Electric Railroad & Lighting Corporation. The Chicago car used aluminum for the air pipe, hand rail, fittings and other miscellaneous parts, while the Interborough used



Another Canadian user of aluminum is the British Columbia Electric Railway. Only recently the company received 25 cars of the type shown

Digitized by Google

aluminum for the interior finish and miscellaneous castings in its cars. In the fifteen cars built by the J. G. Brill Company for the Manila company, aluminum sheet was used for the headlining. This metal was selected so that the cars would have a material which would withstand the ravages of the tropical insects without adding to the weight of the car.



Five tons of aluminum were used in the Blackhall car of the Chicago & Joliet Electric Railway. The car seats 50 passengers but weighs only 23,722 lb.

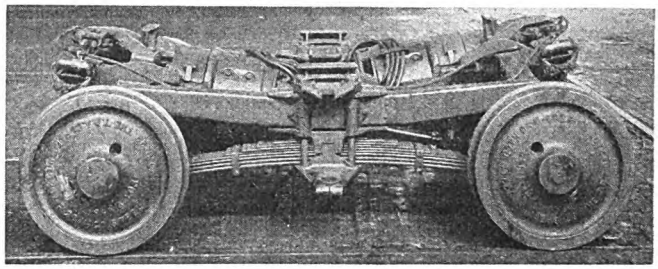
In the early days of the local transportation industry wood was a satisfactory material for use in street car bodies. Later, however, came the need for a stronger material and metal began to replace wood. But aluminum was not ready. While it was effective in resisting the attack of insects in tropical countries, for the highly stressed portions of the structure it could not cope with steel. There were no strong alloys, and heat treating processes were unknown. In the next ten years, however, strong aluminum alloys were developed which have mechanical properties comparable with those of steel and which, at the same time, have the light weight of the parent metal.

The first attempt to reduce the weight of car equipment by means of strong alloys of aluminum was made by the Illinois Central Railroad, which constructed a number of cars for suburban service in 1923. These cars proved satisfactory, so 215 additional cars were built in 1925, with aluminum used for roof, seats, interior finish, doors, conduits, junction boxes, headlights and other miscellaneous parts. About this time the Pennsylvania Railroad went even further and constructed eight suburban cars for its service outside of Philadelphia with all aluminum superstructures. Practically everything above the underframe with the exception of a belt rail was constructed of aluminum. Shortly thereafter the Chicago & North Western Railway built 120 suburban cars having all aluminum sheets above the underframe. Both the Illinois Central and the Chicago & North Western have put additional cars in service since and have extended the use of aluminum somewhat over the original applications.

Among the first electric railways to use alloys were the Cleveland Railway, the Pittsburgh Railways, the Springfield Street Railway, the Chicago & Joliet Electric Railway, and the Montreal Tramways. In the car of the Cleveland Railway aluminum was employed not only in the body and underframe, but also in the trucks. Its total weight of 30,300 lb. represented a saving of 12,901 lb. over the standard car of the company. Because of the extensive application of the lighter metal and the great reduction in weight obtained, much interest was centered on this car.

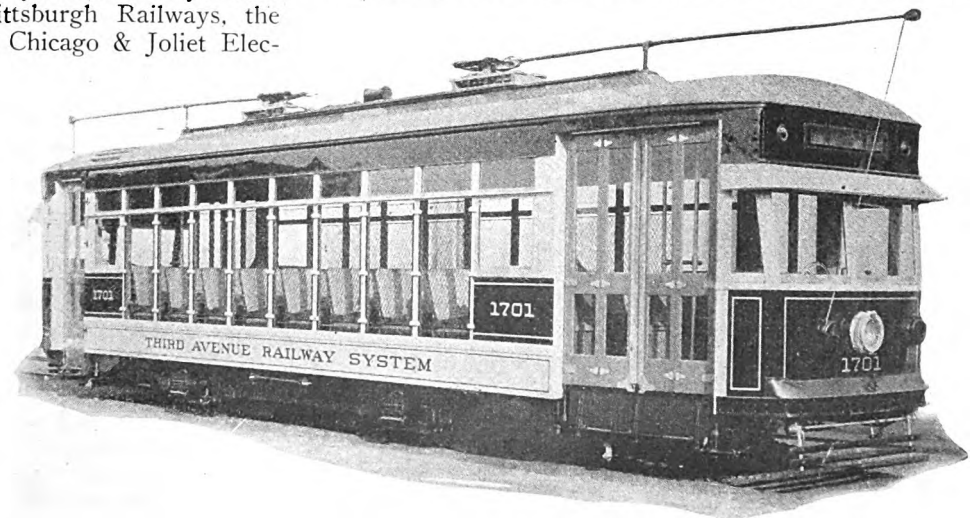
The car designed by the Springfield Street Railway and built by the Wason Manufacturing Company used aluminum for the side members, letterboards, belt rails and body bolsters. Montreal introduced the first aluminum cars in Canada. In one order placed with the Canadian Car & Foundry Company in 1927 both the framing and exterior sheathing were of aluminum; in a second order all the sheathing was of this material. All metal in the car body and underframe of the Chicago & Joliet Electric Railway car was made of aluminum with the exception of the bolts, rivets and similar parts.

During 1927 a car for the United Railways of St. Louis and 25 for the Twin City Rapid Transit Company, all using aluminum extensively, appeared.



Timken-Detroit aluminum truck, weighing 5,621 lb., used under the Pittsburgh Railways all-aluminum car. The weight saving per truck was 929 lb.; for the entire car it was 7,863 lb.

During the next year a few more vehicles were produced, among them being ten city cars for the Delaware Electric Power Company, by Brill, three cars for the Calgary Municipal Railway, built by the Canadian



In this four-wheel car of the Third Avenue Railway, placed in service last September, aluminum was used for the body, underframe and parts of the new truck

Digitized by Google

Car & Foundry Company, a pair of Cincinnati Car Corporation trucks for the Cincinnati Street Railway, and eleven Versare electric coaches for the Utah Light & Traction Company. The latter order marked the first use of aluminum in the construction of trackless trolleys.

Spurred on by the developments in the previous years, the industry brought forth an even greater number of cars using aluminum in the year 1929. Among these were an experimental car for the Pittsburgh Railways, by Osgood-Bradley; a double-truck car for the Department of Street Railways, Detroit; ten interurban cars for the Northwestern Pacific Railroad, by the St. Louis Car Company; a sample car for the Louisville Railway, manufactured by the Cincinnati Car Corporation; the United Traction Company car, built by the Cincinnati Car Corporation; the four-wheel city car of the Third Avenue Railway, manufactured by the J. G. Brill Company; fifteen cars for the British Columbia Electric Railway, built by the Canadian Car & Foundry Company, and a sample car of the St. Louis Public Service Company.

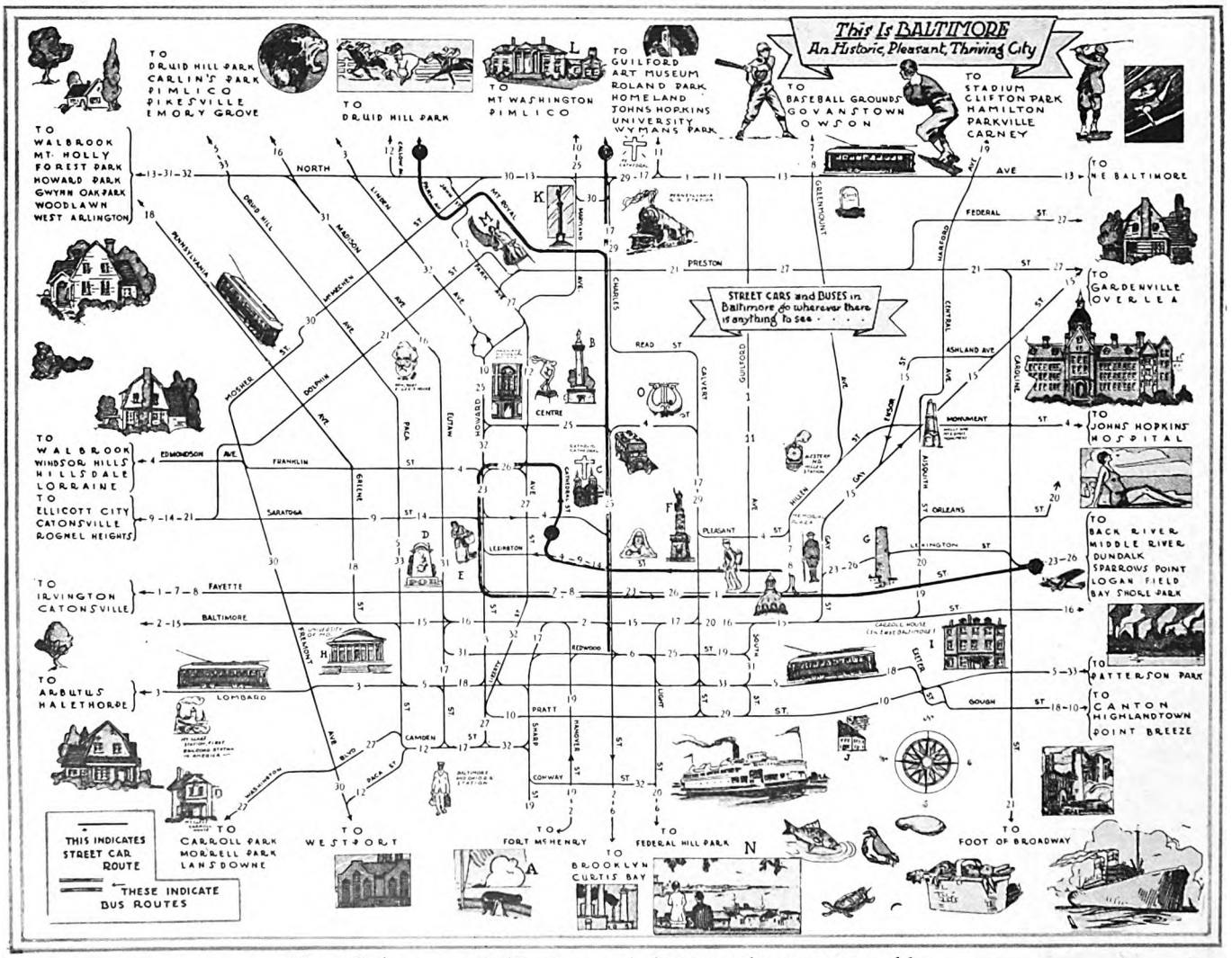
Among the more recent orders for equipment using aluminum are the four-wheel car of the Chicago & Joliet Electric Railway, designed by J. R. Blackhall; three double-truck cars of the Monongahela West Penn Public Service Company, by the G. C. Kuhlman Car Company; thirteen cars for the Youngstown Municipal Railway, of G. C. Kuhlman manufacture; 100 cars for the Brooklyn & Queens Transit Corporation, being built by Osgood-Bradley and Brill; 141 motor cars for electrified suburban service of the Delaware, Lackawanna & Western Railroad, and 300 subway cars for the city of New York, both these orders being filled by the American Car & Foundry Company.

Practically all of these cars have been described in detail in previous issues of ELECTRIC RAILWAY JOURNAL. In the accompanying table the dates of publication of these descriptive articles are shown, along with weight figures and other pertinent information.

With the rapid progress that has been made in the past seven years in the use of aluminum for car construction, and considering its many advantages, there is little doubt that this metal is destined to play an extremely important part in all future vehicle construction.

Railway Distributes Picture Map

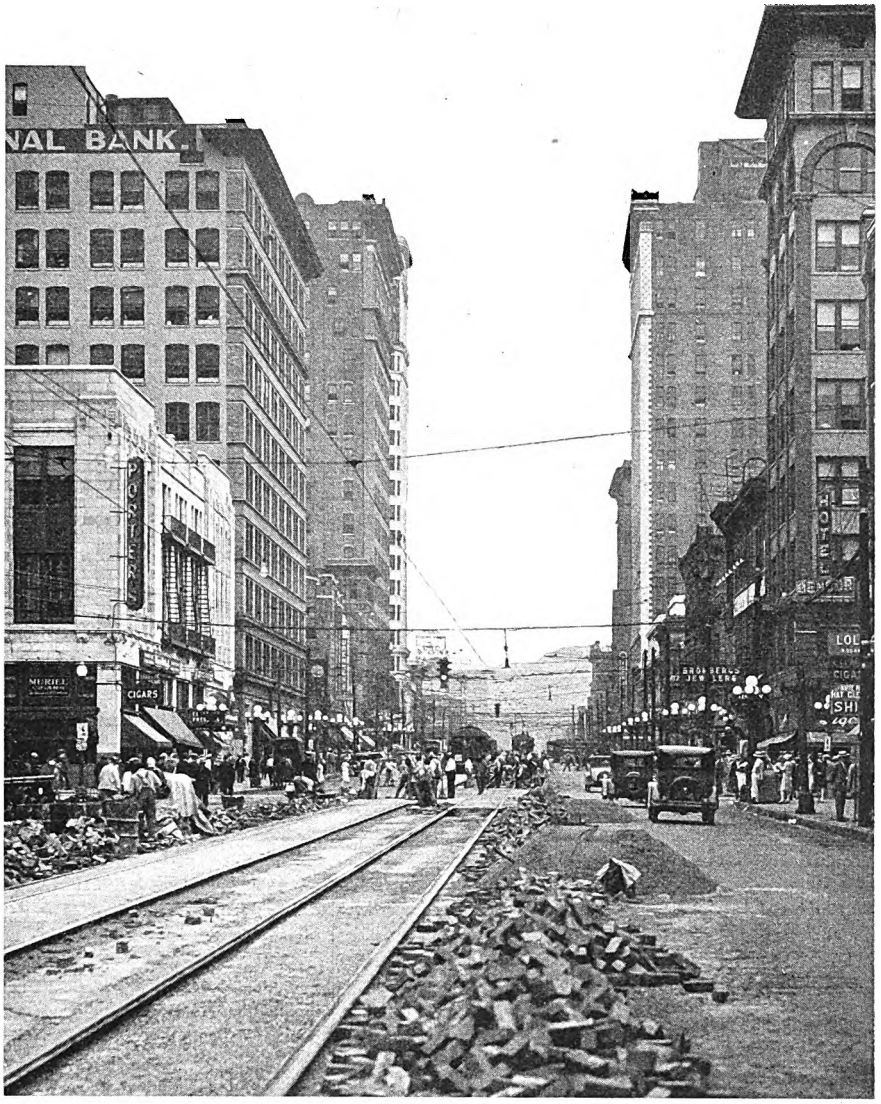
AS PART of the celebration marking the 200th anniversary of the founding of the city of Baltimore, the United Railways & Electric Company printed and distributed a picture history map of the city illustrated in color in the medieval manner. This shows the company's car and bus routes as well as places of historic interest. The map folds up to pocket size. On the back are short sketches telling interesting facts about Baltimore's historic shrines. It has proved very popular with the public and demands were received by the company from individuals, department stores, hotels, etc., for extra copies.



Map tells how to reach historic spots in Baltimore by street car and bus

Digitized by Google

Prominent way engineers give opinions on basic principles of track construction and explain their practices under numerous specific local conditions



SINGLE LIFE *versus* RENEWABLE TRACK

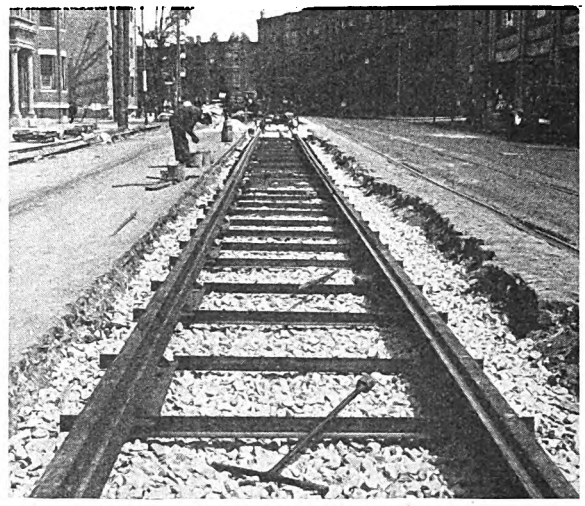
AMONG the factors which determine the design of track laid in paved streets, the possibility of reconstruction at some future date under changed conditions imposed by new grades, street widening, or similar municipal requirements, is of prime importance. It might be thought that in the majority of large cities, alignments, width of streets and grades would have been permanently settled many years ago, but experience shows this is by no means the case. On account of changing conditions brought about by automotive developments within the past fifteen to thirty years, alterations continue to be made. Streets have been widened and straightened; paving construction has improved to meet the demands of greater motor vehicle loads and increased traffic. With a view to determining the effect which these changes have upon the design of electric railway track, the JOURNAL has obtained the opinions of a number of prominent way engineers.

Advocates of single-life track construction feel that had their predecessors 15 to 30 years ago designed tracks on the basis that some parts could be allowed to remain in the ground and be used again now in a rebuilt track, it would have been a mistake. They ask what way there is of knowing what conditions will exist 15 to 30 years hence. Frank B. Walker, chief engineer, Eastern Massachusetts Street Railway, states that in his sixteen years' experience on that New England property, in a section of the country which should be as settled as any other, there have been very few cases where a track has been reconstructed in the exact location and grade of the previous track. He further points out that the industry may be running buses instead of street cars in some places at the end of the normal life of present-day track. To spend any money on ties or foundations with the hope that when the rail is worn out, such material will be of benefit in reconstructing

Digitized by Google

a new track upon the old, Mr. Walker considers would be extremely ill-advised.

The relative advantages of single life and renewable designs depend also to a considerable extent on soil conditions. H. M. Steward, superintendent of maintenance, Boston Elevated Railway, stresses this point in his discussion of the subject. He states that under certain conditions of soil it is necessary to support the track structure on a concrete bed, similar to the invert of a subway. On this concrete bed the track structure is built, using a minimum amount of material for surfacing. With this type of construction it is assumed that the concrete bed below the track structure would not have to be disturbed and that a second track could be built thereon. With other conditions of soil steel ties or some form of mechanical tie may be imbedded in concrete of suitable strength and thickness, the top of the concrete slab being at the proper distance from the head of the rail to allow the pavement required to be installed. Some engineers using this form of track construction are of the opinion that when the rails wear out it is possible to remove the old rail and install new ones, or by using a shallower rail, by raising the grade of the track, or by a combination of both, to build a new track structure on top of the old concrete foundation.



Monolithic concrete track recently built by the Boston Elevated Railway

Mr. Steward further points out that where the soil conditions are more favorable, it is often not necessary to provide a concrete bed for the track structure, or to imbed the ties and a portion of the rail in concrete. Instead, wooden ties and a sufficient quantity of crushed stone ballast can be used to provide a satisfactory track. With this type of construction a concrete base to support the paving, approximately 6 in. in thickness, may be provided, upon which any type of pavement may be laid. When it becomes necessary to rebuild this type of track the ballast, at least, will be available for further use if it is properly cleaned, and it is also probable that the ties, if they have been properly treated, will be in sufficiently good condition to warrant their use for a second track.

Despite these views on the possibility of a renewable type track construction, Mr. Steward believes that a street railway has no permanent right in a public street, but instead, locates and builds its track only "at its peril." Street changes, necessitating complete relocation of a track area, or underground structures which are constantly being installed under or across the track, mean complete or partial reconstruction of the track and substructure. No matter how carefully a track may be constructed, it will be damaged to a very considerable extent if the paving between the rails or alongside the rails is not carefully installed to prevent water from entering.

With the possibility that all or some of these factors will enter into the problem, Mr. Steward does not believe it advisable to expend too large an amount of money with an expectation of building a permanent structure which will not be disturbed, in order that certain parts may be renewed without disturbing the balance.

In San Francisco, the adoption of single-life track construction has largely been governed by local soil conditions. B. P. Legaré, engineer, maintenance of way and construction, Market Street Railway, has found it impracticable to use a type of renewable track structure with the idea of saving a part of it when reconstruction becomes necessary. In that city there are several

In 1907, track on Market Street in San Francisco had to be raised 4 ft. to bring it back to original grade

Digitized by Google

different kinds of soil. A great deal of the downtown, heavy traffic district is made up entirely of fill, over an area which was originally either water or mud flats. In these localities it is impossible to keep the grade of the street at any fixed elevation. Obviously, under this condition it would not be practical to construct a track with the expectation of only renewing the rail and utilizing the foundation at some future date. On the Main Street-Market Street line, Mr. Legaré has reconstructed the track twice in the last 24 years. In each case the street had sunk below the official grade and had to be brought back to that grade at the time of laying the new track. The first time it was raised approximately 4 ft. and the second time, at the same place, 3 ft.

In other localities of the city, where the soil does not settle and stays at practically a uniform grade, the renewable, his observation of such construction has always been that by the time the rails needed replacing, new ideas of construction or unsatisfactory results necessitated entirely removing the parts which were supposed to be permanent. This often resulted in excessive costs and sometimes abnormal delays. He feels that nothing has yet been brought forward to equal the wood tie construction on a resilient base. Standard construction of the Municipal Railway consists of wood ties laid on a substantial hard rolled sub-ballast. Experience has proved that in using California split redwood ties, the life of the wood is equal to that of the rail on all of the major routes. Complete reconstruction of such track is done at minimum expense and with the least disturbance to service.

M. M. Johnston, division engineer, the Connecticut Company, New Haven, Conn., in discussing his prefer-

Again in 1923, complete reconstruction of track structure had to be made on Market Street, San Francisco, when street was brought back to official grade

Market Street Railway has been forced to renew track areas in conformity with changes in street structure made by the municipality. In order to meet the change in traffic conditions and the demands of modern motor vehicles, the city has tended to replace old pavement with more modern structures, which in many cases change the crown of the road. The city of San Francisco is replacing a large number of granite block pavements with asphalt, the latter requiring a much flatter crown than the block construction. This, of course, necessitates a change in the elevation of the track structure.

If the electric railway track were built on a permanent foundation, it would be awkward to find a rail that would fit the changed conditions, and such construction would be very expensive to tear out. Experience on the Pacific Coast has proved that, in a paved street, the redwood tie will last as long as the rail and should be renewed when the rail is renewed.

Further experiences in San Francisco are given by M. M. O'Shaughnessy, chief engineer, Municipal Railway of San Francisco. Although he has never used a type of construction in which only certain parts are ence for single-life construction, states that the most economical method of designing and building a track structure should insure full serviceable life of the particular rail section to be used on each job. In other words, the rail should be the governing factor in track design. He believes that as there is usually very little material of value that can be salvaged or re-used after this period, it is more economical to rebuild the entire structure after the rail is worn out in service. He further states that with the present improved methods of welding the rail, it seems only reasonable to assume that the joint is no longer one of the weakest points in the track structure and that its life, with reasonable maintenance in the way of grinding out any depression that may develop on the rail head, will equal that of the rail.

In discussing the ties to be used, Mr. Johnston believes that either wood or substitute ties will function properly during the life of the rail, provided proper care is taken in their selection. With the wood tie properly spaced to distribute the loads on the ballast, tie plates used to prevent cutting the rail and the ties thoroughly protected by a good concrete foundation, there seems to

Digitized by Google

be little fear that the ties will fail before the rail life is gone. In his opinion excessive rail movement, which is so destructive to the ties and pavement, usually develops from one or more of the following causes: Improper spacing of ties, poor tamping or spiking, and the failure to use tie plates when necessary to distribute the load and prevent rail cutting. If this movement is prevented by good designing and careful inspection, Mr. Johnston believes there should be very little trouble, if any, from tie failures.

Track structures built for single life as a unit, but with a maximum amount of salvage value when rail renewal becomes necessary, are considered by Howard H. George, superintendent of way department, Cleveland Railway, Cleveland, Ohio, as the ideal construction. Mr. George's experience has taught him that the design of a track structure should be governed by the following factors: The probable number of years the track will be required to be maintained in the location at which it is to be constructed; the volume of traffic it will be required to carry during that time; and the probability that, within its normal useful life, it will have to be disturbed for reasons beyond the control of the railway, as, for instance, changes in grade or alignment of the street.

These factors will all have an important bearing upon the type of track which should be built, but even when they are determined within a reasonable degree of accuracy, sound economics should control the final selection. Mr. George believes this goes much farther than first cost. The following conditions should be met: The design should provide reasonable assurance of the maximum useful life for the structure as a unit; it should be such as to insure the minimum amount of expense for maintenance during its useful life; it should be such as to permit the maximum amount of salvage when rail renewal becomes necessary, and this requirement takes into consideration the possibility of renewing with a different rail section than that used originally; it should be such as to make it entirely practicable to make any necessary repairs with a minimum interference with car operations, and finally, it should be such as to interfere for the shortest possible time, and to the least possible extent, with the public use of the thoroughfare on which it is constructed, either for its original construction, ordinary repairs, or for major renewals.

Pressure-treated creosoted wood ties are used in Cleveland

It has been Mr. George's experience over a period of 25 years that these requirements are best met by a type of construction which will permit the structure, from the ties down, to wear out at least two sets of rails. He prefers pressure-treated, creosoted wood ties, and believes that if proper and well-known rules and precautions are observed in constructing such track it will give excellent service during the normal life of the first rail, and when it becomes necessary to renew this rail, it can be accomplished with minimum expense and with the least interference to the public use of the street as well as car operations. Mr. George adds "What we must aim for is to reduce the cost per year of useful life of every unit in the track to the smallest figure practicable. But in any case, all the factors must be considered and not just a few."

That the question of single life versus renewable track construction hinges on the proper treatment of the paving problem is the opinion of W. R. Dunham, Jr., Department of Street Railways, Detroit, Mich. He believes that to determine the proper track construction the pavement must be considered as a part of that structure and that track should be designed so as best to fit in with it. A break-down in pavement even when laid around track built in the best possible way as a track structure, will inevitably cause high maintenance costs, together with the destruction of the track. The breakdown may be entirely due to the track construction. A pavement must be rigid if it is to withstand traffic; a flexible track cannot be built in a rigid pavement without destroying the pavement. To build a track in these days with the basic idea in mind of renewing a part of it 40, 30, or even 20 years hence in the face of ever-changing conditions in the industry, hardly seems warranted. Mr. Dunham's experience indicates the need for more thought for permanency and less for renewability.

It has been the standard practice of the Birmingham Electric Company, Birmingham, Ala., to construct track on creosoted ties with well-tamped ballast. On top of this is placed a 6-in. slab of concrete to hold the brick paving. According to A. Taurman, superintendent of equipment, way and structures, this type of construction has worked out very satisfactorily for the following reasons: Creosoted ties and blast-furnace slag are easily secured at reasonable prices; this type of track construction can be done under traffic; the territory along many of the streets in Birmingham is not very well developed and the gas, water, and sewer lines in many places have not been installed. This type of track construction readily lends itself to repairs when these lines are installed as the city develops.

The only criticism Mr. Taurman finds with this type of track construction is that when the rail is worn out the concrete slab may have to be removed, but he feels there is no reason why the ties and ballast should not be used. The type of rail he is using is 101-lb. T, with thermit-welded joints, which he estimates under traffic conditions will last from 20 to 25 years. In the downtown section, where traffic is heavy, the Birmingham Electric Company installs 122-lb. girder rail, and Mr. Taurman is of the opinion that track constructed where both vehicular and electric car traffic is heavy should have a permanent base if possible, so that when the rails are worn out they may be renewed with as little interruption to traffic as possible. He has recently found it necessary to renew rails in the downtown section where the track was constructed on this basis, and found that

Digitized by Google

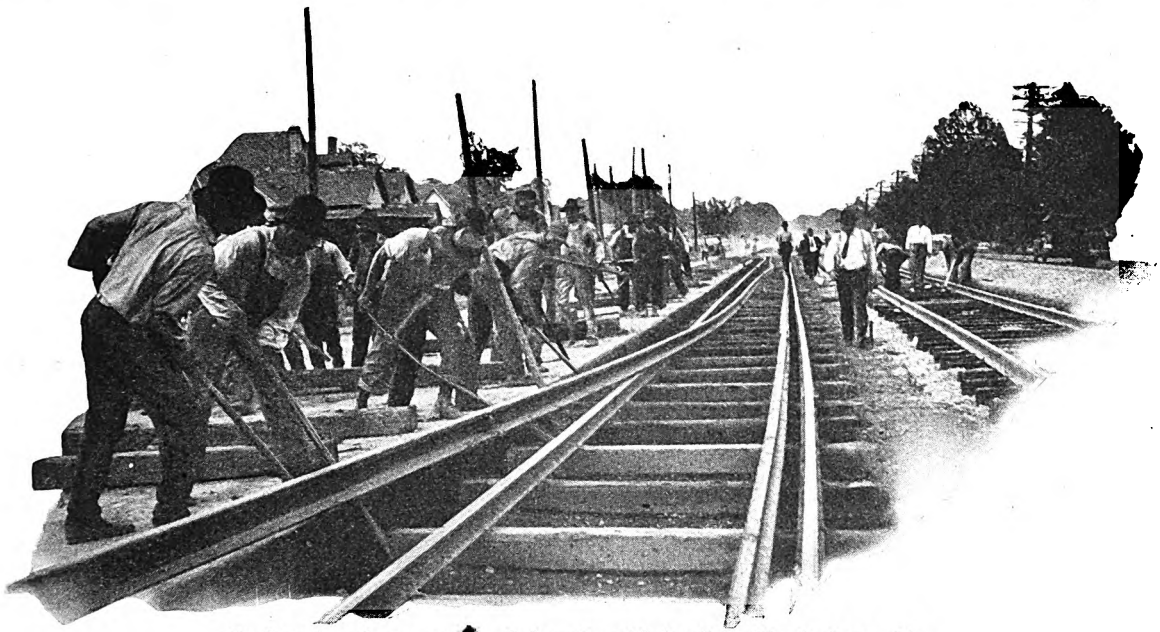
the interruptions to traffic were very slight, compared with what they would have been if the entire foundation had had to be removed.

J. H. Haylow, chief engineer, Memphis Street Railway, Memphis, Tenn., states that experience in this city proved that a track foundation consisting of stone ballast, well drained, and creosoted pine ties covered with concrete will endure for at least 40 years. Also, that 7-in. standard A.E.R.E.A. rail, judging from his experience in other sections, will endure for 20 years. Why not, therefore, install another rail on the same foundation? By so doing Mr. Haylow believes that money can be saved, that the accident liability of the company can be reduced and that much inconvenience can be saved the company as well as the public. He believes that these considerations constitute convincing evidence that it is not only good engineering but good business to construct a track foundation that will not be materially interfered with when the time comes to renew the rail. The standard type of track construction in Memphis is shown in an accompanying illustration.

In discussing his preference for renewable type track construction E. P. Roundey, engineer way and structures, New York State Railways, Utica, N. Y., takes into consideration the factors which affect the first cost, maintenance and replacement. He considers the three types of track structure most commonly used, namely, "steel tie and concrete ballast, wood tie and concrete ballast, and wood tie and stone or gravel ballast." The concrete-ballasted type, with either creosoted wood or steel ties, is the type which ordinarily will require renewal of the rail only. The wood tie and stone or gravel ballast type usually requires renewal of the ties as well as the rail, unless the ties are creosoted and protected from mechanical wear by tie plates.

Mr. Roundey's experience has shown that in some cases many of the ties in concrete-ballasted construction become loose by the time the rail is worn out so that much of the ballast has to be excavated and replaced. This costs about as much as it does to replace wood ties on stone ballast. However, when conditions of the subgrade are proper, the width of street definitely settled for a long period of time and the probability of change in grade of the track is slight, Mr. Roundey believes that a carefully constructed track area with a permanent foundation is economical and that rail renewals can be made without disturbance of the sub-structure.

C. A. Smith, superintendent roadway department, Georgia Power Company, Atlanta, Ga., believes that the question of single life or renewable type track construction depends principally on what is likely to be done in the street in the repaving or changing in grade at some future time. He states that it would not pay to go to any additional cost to make provision for the renewal of the rail on the old foundation if there was a likelihood that the grade of the street would be changed or that the type of pavement would be such that the original foundation could not be used. In some instances, however, such foundations can be provided at very little additional expense, and when the time comes for the rail to be renewed this can be done on the old foundation, if properly constructed, at a saving of a great deal of expense over the reconstruction of the whole track.



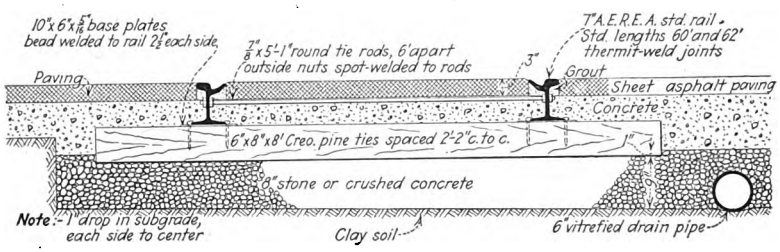
Snaking-in a long section of thermit-welded rail in Birmingham, Ala.

Many renewals of this sort have been made in Atlanta. For example, last year it was necessary to renew the rails and special work at Peachtree Street, near Currier Street. This special work curve of 9-in. guard section was built in 1915, the foundation being creosoted pine ties on grouted ballast. The estimated cost of tearing up the whole paving area, track and foundation and replacing them was approximately $12,000. It was anticipated, however, that the creosoted ties and grouted ballast would be in good condition and, therefore, the pavement was opened up for approximately 1 ft. on each side of each rail only; tierods were burned off; the old rail was taken out and a new 9-in. rail of exactly the same alignment laid on the old ties. The ties and foundation were found to be in good condition. Beveled tie plates were installed on each tie. In 1915, it was not the practice to use steel tie plates as it is now, and without these plates Mr. Smith has found that the life of a creosoted tie is determined by mechanical wear rather than by decay. The old tierods were burned off about 6 in. from the rail and new tierod

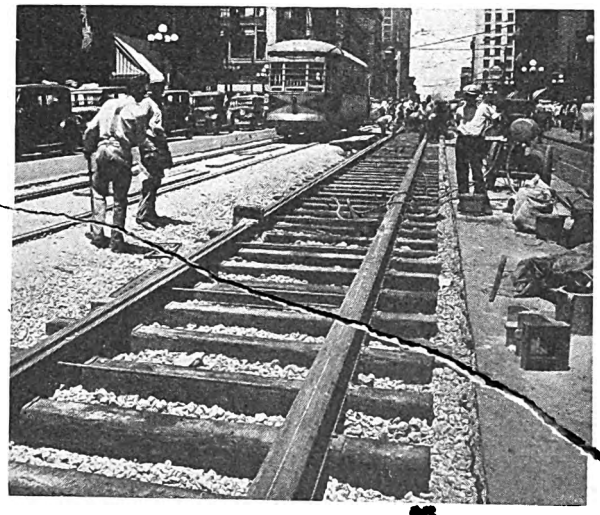
Digitized by Google

terminals welded to the old rods. This eliminated the necessity of tearing up the pavement to install new tie-rods. The total cost of the job, carried on as outlined above, was $5,920, only about 50 per cent of what it would have cost to reconstruct the whole track, including the foundation and pavement. A sketch showing the tierod terminal is shown with this article.

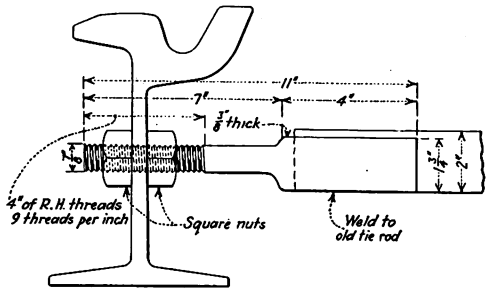
Likewise, Mr. Smith's department has had many instances where it has been able to renew special work, such as double-track branch-offs, using the same design of work and same depth of rail, laying the new work on the old road bed, this road bed consisting of creosoted pine ties and grouted ballast. Whenever this can be done, it saves approximately 50 per cent of the total cost as compared with what the cost would be if the whole roadbed had to be reconstructed. The present practice in Atlanta on straight track is to use 80-lb. A. S. C. E. rail, beam construction with ties spaced 5 ft. on center, concrete pavement. The reasons for the adoption of this design are its low cost of construction and its permanence. Renewal of the rail without renewing the foundation in the future was not a primary factor. This, however, Mr. Smith thinks can be done.



Standard track construction used by Memphis Street Railway



Treated wood tie and stone balast sub-structure is used to serve through the life of two rails in Memphis



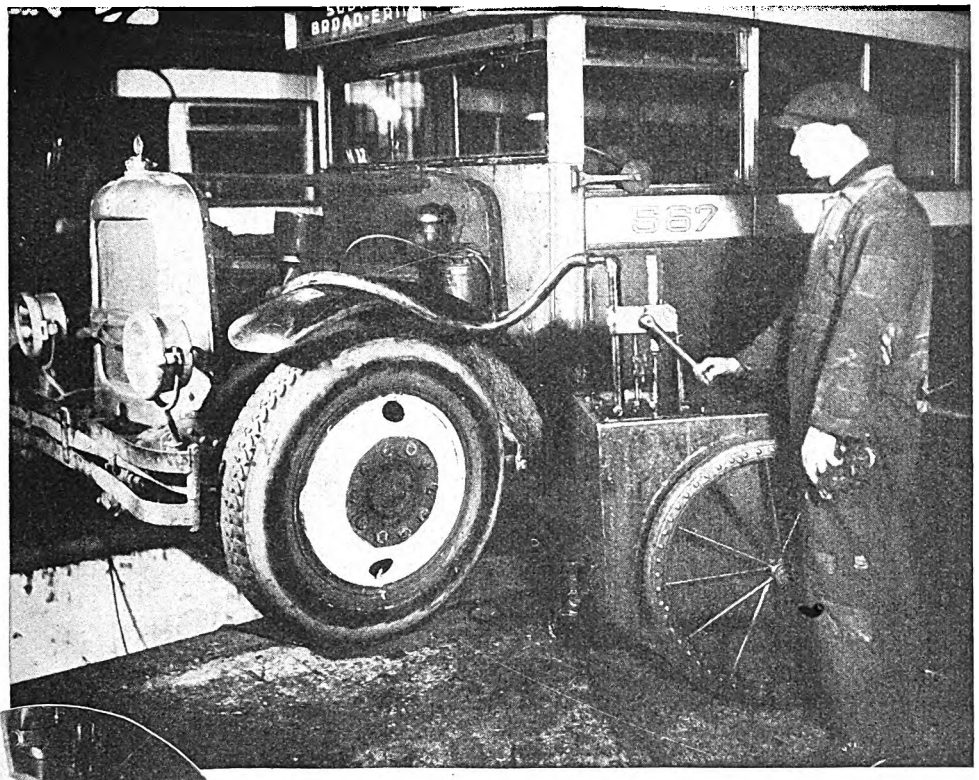
Welding new terminals to old tierods has effectively cut the cost of track renewal in Atlanta

The question as to whether it is more economical to build single-life or renewable track is one that requires careful consideration of the specific conditions to be met. This is the expression of H. F. Merker, formerly chief engineer, Brooklyn City Railways, Brooklyn, N. Y. Assuming that economy is the basis on which the question is to be considered, there should be some assumption as to what can reasonably be considered the life of a piece of track. Many tracks have been declared worn out, yet have carried cars for a considerable number of years thereafter by careful maintenance. The life of track has been variously taken at as low as 10 years and as high as 25, and furthermore there are tracks still in service as old as 30 years or more. Somewhere within this range, however, would lie the life that would have to be considered. In selecting the type of track for any specific condition Mr. Merker further considers the kind of paving to be used, and what assurance there is that when the track is later to be reconstructed the same type and design will be used. Again, what section of rail is to be used, and can it be determined what section will be used in future reconstruction? What will be the grade of the reconstructed track? What is the soil condition and does it require a rigid foundation to carry the track?

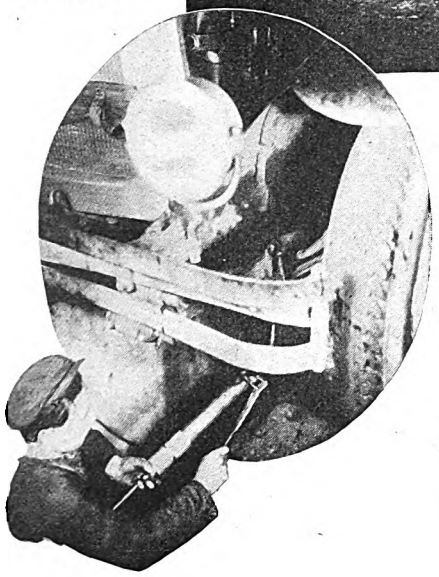
This latter question of soil conditions Mr. Merker considers an important one. If a rigid foundation is needed on account of local soil conditions (and this is frequently the case) then the foregoing questions shrink in importance, and it might be just as well to provide a renewable type of construction, as the loss would not be great if the conditions, by chance or otherwise, were unfavorable to renewal. If, however, there is doubt as to the kind of paving that would be used in reconstruction, or if there is a likelihood that another section of rail will be used, or if a change of grade is probable, and particularly if the local soil condition is such as to permit a much cheaper type of construction for base or foundation, then it would not seem good business to invest a large sum of money in a construction that is not really needed.

Mr. Merker states that there have been many localities where a track could safely be built with nothing under the ties but the natural soil, assuming that the ties used were standard wood ties, with the usual spacing. There would be needed, of course, a base for the paving, but when time came for a renewal, the entire structure could economically be scrapped and entirely renewed, allowing at the same time a change of type or section of rail, a different sort of paving, and at the same time any change of grade that might be required. Many soils, however, lack the supporting qualities necessary for this type of cheaper track construction. In such a case it would be far better to add the extra cost in building a track that would distribute the load, keep out the water and permit the renewal of the worn parts, which would be the rail, leaving the sub-structure to do additional service for another life. Mr. Merker concludes that in his opinion there is no one type or design of track that would meet all conditions, that each case or each locality must be carefully considered individually and the track structure designed accordingly.

Digitized by Google



At each scheduled repair, the mechanic in charge of engine inspection is responsible for the draining, cleaning and refilling of the crank case



Sheer gat grease guns are used to lubricate steering and other chassis mechanisms

Economies Effected

in

Bus Lubrication

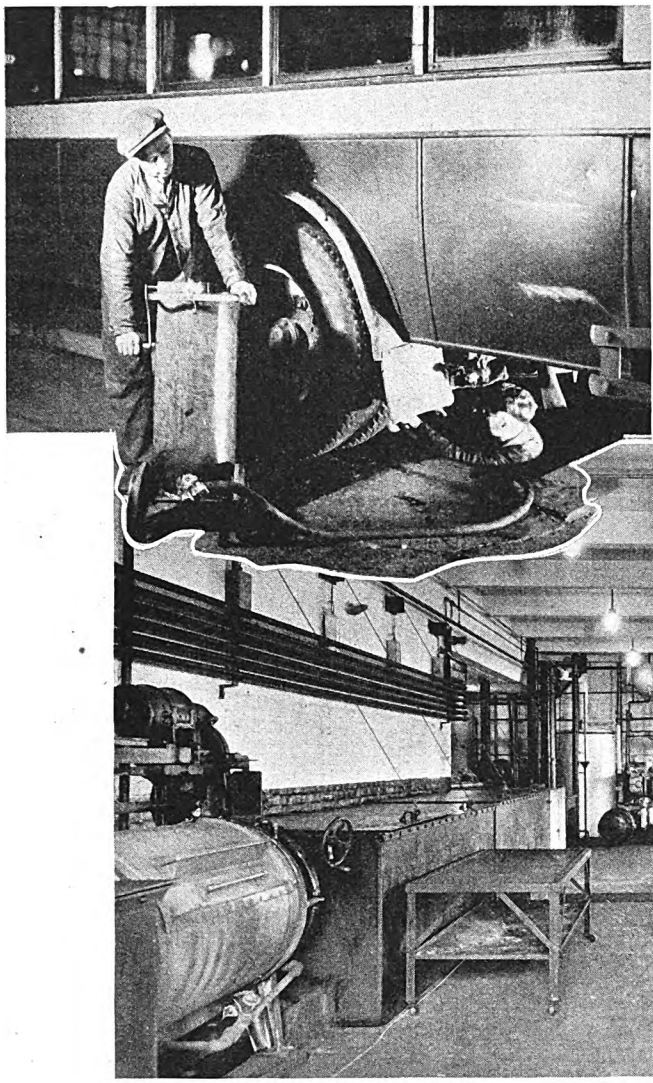
Individual responsibility of the mechanic for the proper lubrication of parts he inspects at scheduled repair periods and reclamation of oil are important features of bus maintenance practice of P.R.T.

BY GIVING special attention to the subject of bus lubrication, the Philadelphia Rural Transit Company, subsidiary of the Philadelphia Rapid Transit Company, has effected substantial savings. Maintenance practices carried on in its shops are regulated by the actual amount of service performed by each vehicle. All buses are gasoline-electric type Yellow Coaches, equipped with kilowatt-hour meters. Inspections, repairs and lubrication are scheduled according to these meter readings.

When the meter shows 3,500 kw.-hr. service, which corresponds to approximately 2,500 miles, the bus is held out for a day and subjected to what is known as a "scheduled repair," including thorough inspection, minor repairs, and complete lubrication. Each mechanic assigned to work on a part of the vehicle is held responsible for the proper functioning of that part. One man tests and greases all steering mechanism, another the rear end, and a third all electrical equipment. The mechanic assigned to brake inspection packs all the wheel bearings and the man in charge of engine repairs drains the oil, cleans the lower half of the crank-case and refills the case with the required amount of clean oil.

Routine oil replenishment is made each time the bus enters the garage, regardless of whether it has operated one trip or a full run. On long runs the oil and gasoline are checked on the street at scheduled periods of about every eight hours, and replenishment for buses in the north end of the city are made at the company's filling station at Broad Street and City Line. On a number of vehicles which operate on outlying routes, special gaso-

Digitized by Google



Upper view—Portable pumps of different sizes and construction are used for different lubricants

In center — A centrally located fireproof building houses the oil and waste reclaiming equipment exclusively

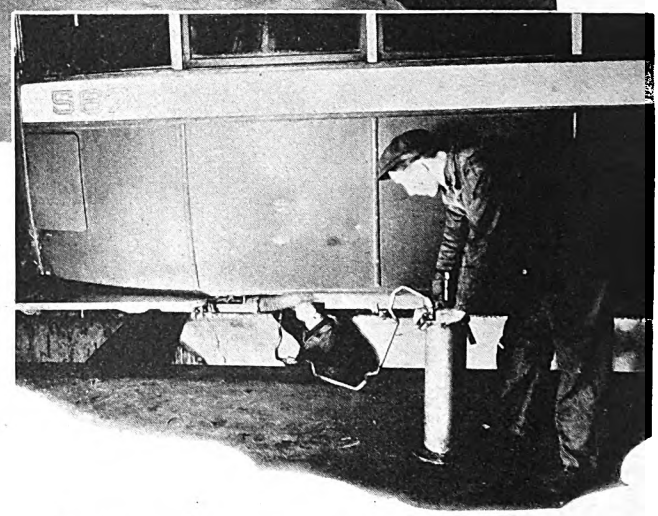
line tanks of 80-gal. capacity, and 16-qt. oil cases have been installed, so that oil and gas will not have to be added during a full day's operation.

Two additional lubrications are based on a kilowatt-hour meter reading. At between 8,000 and 9,000 kw.-hr., all brakes are relined, at which time axles are dissassembled and packed with grease and at 105,000 kw.-hr. the buses are routed to the general shop for complete overhaul.

Five grades of grease have been adopted as standard for heavier lubrication. Universal grade is used on the steering mechanism, in the universal, front and rear wheel bearings, fans and for all other chassis lubrication. A grade 600-W is used in the rears only, and a special ball-bearing lubricant, grade A, is used on all power generators and motors. A special water-pump grease is used on the water pump only. Medium grade oil is used for the lubrication of starting motors, lighting generators and distributors.

One oil, known as M.M. summer heavy, is standard throughout the property for engine lubrication. It is an all-year-round oil of such quality that the company has found it suitable for repeated reclamation. A mixture of new and reclaimed oil in a ratio of 60-40 parts, respectively, has proved satisfactory and is supplied to the engine at scheduled repairs and at daily replacements.

A process whereby the oil drained from the crankcases is saved, reclaimed and mixed with new oil for use again is a prime economy factor in P.R.T.'s maintenance practices. When the mechanic at the garage, who is in charge of engine repair, drains the oil from the crankcase of the bus he stores it in steel drums for shipment to the reclaiming plant. When a truckload of drums has accumulated they are transported to a centrally located building which is used exclusively for the reclaiming of this oil and the reclaiming of waste. Here the oil is transferred to a series of 550-gal. storage tanks.



Power generators and motors are lubricated with a special ball-bearing grease

The equipment used in the reclaiming process consists of a mixing and treating tank, a centrifugal oil purifier for removing carbon, dirt and other inorganic matter, and a distilling apparatus for removing the water and reagent used and for restoring the viscosity. The same equipment is used for the reclaiming of oil drained from the crankcases of the taxicabs owned by the Philadelphia Rapid Transit Company as well as buses maintained for its other subsidiaries. Approximately 200 gal. of oil is put through the process on each day that the plant is in operation, three days each week being devoted to bus oils and two to those from taxicabs. Thus approximately 1,000 gal. of oil is reclaimed each week.

Digitized by Google

The process is begun by pumping the oil from the storage tanks into the mixing chamber where water and a reagent are added, the whole mixture then being heated to about 200 deg. F. and well agitated. The mixture is then pumped through a centrifuge at the rate of 80 to 100 gal. per hour, where the greater part of the foreign matter is removed. The clean oil is sent by gravity to the rectifier where the diluent is removed by a distillation process.

The oil is circulated through two electric heater elements to the top of the rectifier where it filters down over tile and again circulates until it has reached a temperature of 130 deg. C. Dry steam at low temperature is forced into the rectifier in an opposite direction to the oil flow. The gasoline and kerosene contents are vaporized and carried off by the steam to the top of the rectifier and into the condenser, to be collected and used around the plant for general cleaning purposes.

With each 10-deg. increase in oil temperature the steam admission valve is opened wider. By the time the oil has reached 195 deg. C. the valve is in full open position. At this temperature practically no more foreign elements are present and the process is completed. About 3½ hours of still operation are necessary to bring the oil back to its original viscosity. It is then passed again through the centrifuge to remove any final traces of dirt and then put into drums for shipment back to the various garages.

90 Per Cent of Oil Reclaimed

A very careful check is kept on the oil thus reclaimed. Each day a sample of the reclaimed oil is sent to the company chemist for inspection and comparison with the new oil as originally purchased. Approximately 90 per cent of the oil put through this process is reclaimed for re-use, the remaining 10 per cent being lost in the form of carbon and dirt.

The time required for the entire reclaiming process covers approximately ten hours and the process is handled by one man. The cost is slightly under 10 cents per gal., which includes labor and material, depreciation and maintenance, power and trucking.

Proper Lubrication Prolongs Life of Control Equipment

By G. L. Moses
Renewal Parts Engineer
Westinghouse Electric & Manufacturing Company

FROM an operating standpoint, it is much worse to "over-lubricate" control equipment than to neglect its lubrication. The important points to lubricate on electric railway control apparatus are the contact fingers and piston leathers, but such lubrication should be done sparingly. Frequent operation of drum controllers and other control apparatus, such as reversers, interlocks and sequence switches, in which contact surfaces move under fingers, may cause considerable wear to both finger and contact surface. This wear can be materially reduced by proper oiling. This should not be done, however, unless the controller can be kept clean and free from abrasive dust. The collection of such dust in the lubricant will increase the cutting, thus defeating the purpose.

Lubrication Schedule for Control Equipment

Part	Lubricant	Period, Miles
Main circuit controller fingers and contac's	Light oil	500
Master controller and interlock fingers and contacts	Light oil	2,000 to 3,000
Controller bearings	Light oil	1,000 to 2,000
Air cylinders (and piston leathers)	Special oil	10,000

The proper lubricant for fingers and contact surfaces is a light machine oil. Vaseline should not be used, particularly in cold climates, as it is stiff, and, if not properly applied, may lift the finger off the contact causing failures in service.

The contacts and fingers should be clean and dry when the lubricant is applied. Kerosene may be used in cleaning them if necessary. The lubricating oil should be applied to fingers and contacts with a cloth or small brush. The apparatus should then be operated so that the fingers pass over the contact surfaces several times. Afterwards the surplus should be removed from finger tips and contact surfaces with a clean cloth.

Contacts where arcing is severe, such as main circuit drum controllers, should be lubricated frequently. This can be done at light inspection or once a week.

Caution Against Excessive Lubrication

A general use of oil in piston leathers, except during overhauls, is not recommended as the treatment of the leather provides sufficient lubrication for ordinary service. The excessive use of oil on piston leathers should be avoided as more damage may be caused from excessive oil than from too little. If severe service necessitates extra lubrication of piston leathers, the oil recommended by the manufacturer of the equipment should be used in small quantities as follows:

1. Inject through the hole in the top of the cylinder casting not more than $\frac{1}{8}$ oz. (1 teaspoonful) every 10,000 miles.

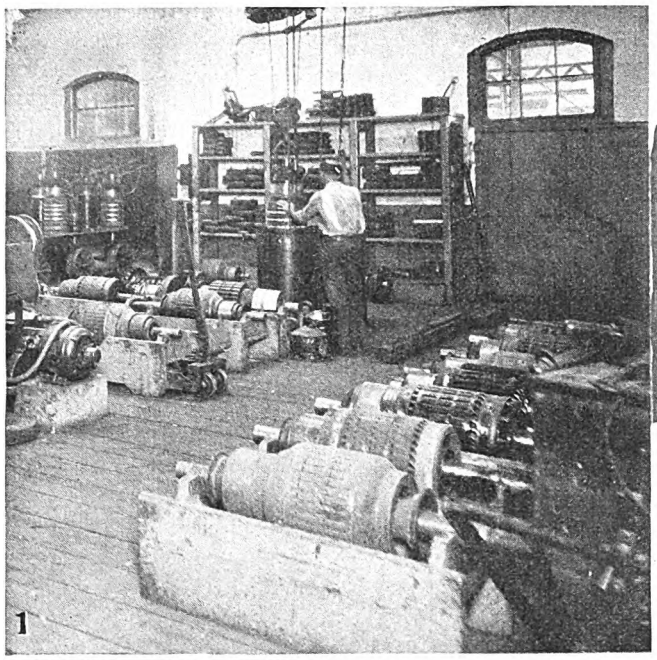
2. Oil may be used more frequently should pistons shows signs of becoming gummy, but only in sufficient quantities as a solvent to obtain free operation until piston leathers can be cleaned or replaced.

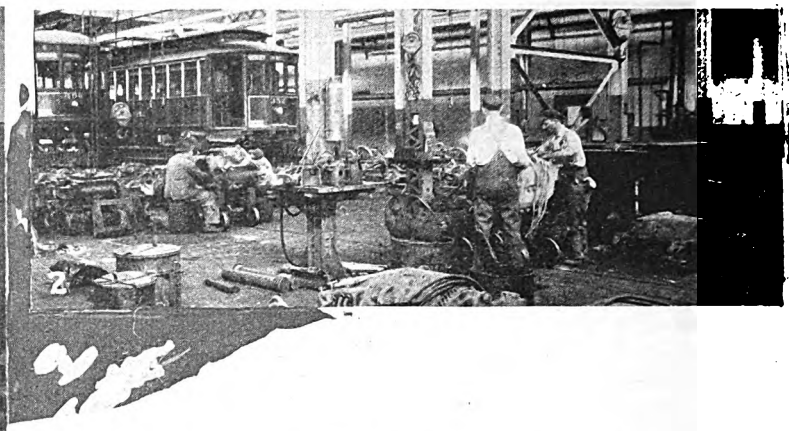
This oil should be used during heavy overhaul when the pistons are removed from the cylinders. Pistons and cylinders should be coated well with this oil after being thoroughly cleaned. Approximately $\frac{1}{16}$ oz. is required for each cylinder and piston.

Bearings of all rotating members, drums, pawls, rollers, etc., of control apparatus should have a light oil applied at every other regular light inspection period.

The accompanying tabulation indicates the parts requiring lubrication, the proper oils and the frequency with which they should be applied.

Digitized by Google





Shop Efficiency

Overhaul of equipment has been put on mass production basis at New Orleans. Quality of work has been improved by specialization. Availability of extra parts at operating stations encourages preventive maintenance

RECOGNIZING that good maintenance is an important factor in giving the type of transportation service demanded by the public, the management of the New Orleans Public Service, Inc., shortly after the reorganization of this property in 1920 placed the operation of the equipment department on an entirely new basis. The company undertook to improve the rolling stock in every possible way and to stimulate interest among the personnel employed in its maintenance. Change after change was made in the course of the next few years, each one contributing in some measure to lowering the cost and improving the quality of work. In July of 1924 the company instituted the unit replacement system, accompanied by a rigid program of inspection. Further modifications in the plan were made as they appeared warranted, but the general principles have been adhered to consistently.

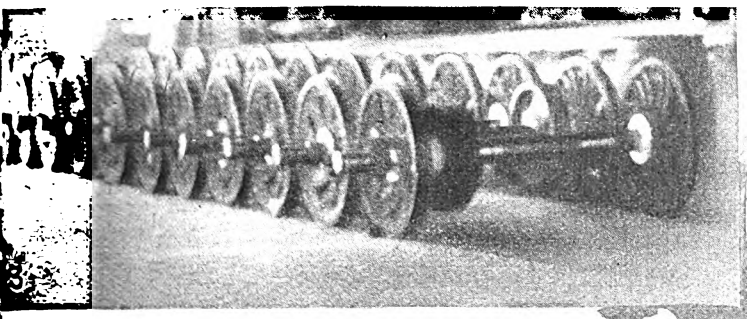
The maintenance achievements of the New Orleans Public Service, Inc., during the past few years are well known to most equipment men. In November, 1920, the maintenance cost per car-mile of the railway was $0.057. For the year 1924 this figure was $0.02114, representing a reduction of $0.03586, or 62.9 per cent. For the year 1925 the figure was $0.01979; for 1927 it was $0.01958, and for 1928 it was $0.01919.

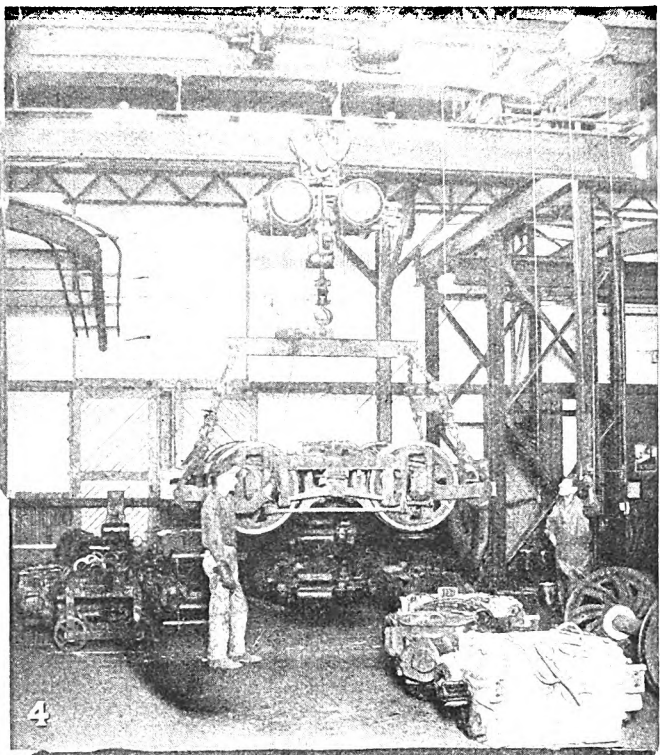
The results of preventive maintenance methods and a high standard of workmanship, however, are even more strikingly reflected in the record of pull-ins. For the year 1929 the company led the 27 members of the Electric Railway Association of Equipment Men, Southern Properties, with the remarkable record of 303,985 miles per pull-in chargeable to equipment, exceeding the second company on the list by 160,946 miles, the third by 161,223 miles and the fourth by 258,981 miles. In total pull-ins New Orleans was second among the 27 companies with the figure of 62,835 miles per pull-in. In this connection, it should be remembered that strike conditions in the city during 1929 were responsible for a number of cars being taken out of service. Over the period of the past nine years the company has made a remarkable record in increasing its average car mileage per pull-in for any cause. From 1921 to 1929, inclusive, the annual figures were 2,803, 10,168, 23,791, 37,080, 64,918, 100,838, 152,632, 121,001 and 62,835. In the matter of pull-ins for mechanical defects, the company has made the following record: 1921, 5,797; 1922, 1,247; 1923, 304; 1924, 118; 1925, 79; 1926, 56; and 1927, 35.

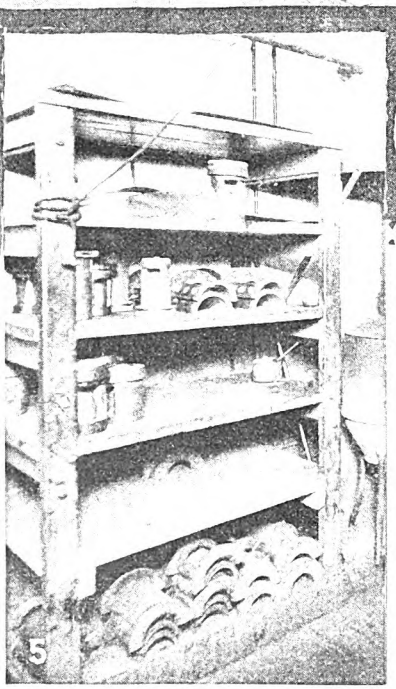
While increasing its standard of maintenance the company made a large decrease in the number of men employed. Figures for the Magazine and Carrollton shops show that 234 men were employed in 1921, 223 in 1922, 219 in 1923, 203 in 1924, 148 in 1925, 132 in 1926, 126 in 1927 and 112 in 1928. It will be noted that the last figure is less than half of that for 1921. By centralizing all overhaul work the company also was able to reduce the number of men employed at the outlying stations. Number of men employed at the stations, with the exception of the repair foremen and clerks, totaled 220 in 1921, 213 in 1922, 208 in 1923, 187 in 1924, 161 in 1925, 148 in 1926, 146 in 1927 and 135 in 1928. Another indication of the improvement in quality of work is shown by the steady reduction in the number of armatures requiring rewinding. Rewinds totaled 201 in 1923, 148 in 1924, 55 in 1925, 36 in 1926 and 30 in 1927.

Undoubtedly, the unit replacement system has contributed to a notable extent in these achievements. Among the important factors which have been instrumental in raising standards and lowering costs are the organization of the department of rolling stock and shops, each man in the set-up having his duties definitely outlined; supervision of all shop work by trained engineers; educational facilities for the foremen and department heads; regular monthly meetings of department heads, at which methods and costs are discussed; creation of competi-

Digitized by Google







Improved by Unit Replacement System

tion among the stations through comparison of records; careful selection of employees; an excellent morale, reflected all through the organization; elimination of all manufacturing in the shops; active participation in the Electric Railway Association of Equipment Men, Southern Properties, through attending meetings, exchanging ideas and comparing costs and records; installation of all necessary modern machinery and equipment; a rigid inspection system; use of the most modern shop methods; thoroughness in all repairs, and complete overhaul of all equipment. No single one of these factors is responsible for what is being accomplished, but all are important elements in the functioning of the rolling stock and shops department.

Periodic inspection in New Orleans is conducted in the five outlying stations on a 1,000 car-mile basis. Instructions are issued daily in written form to the station foremen, advising them which cars are due for examination. All pneumatic, electrical and mechanical equipment on the cars, from the trolley wheel down to the brake shoes, is thoroughly inspected, as well as the car body itself. If this inspection discloses that some repair work must be done, the work may or may not be done in the station, depending on the nature of the repairs. For example, no motor repairs are performed in the station; the car must be sent to the equipment overhauling department. Line breakers or circuit breakers may have their contact tips renewed in the station, but all other work must be likewise performed at the equipment overhauling department. Hence, each station is supplied with several line breakers, circuit breakers, lightning arresters, resistors, motormen's air brake valves, air compressors, governors, truck brake rigging, and wheel and axle replacement units. Therefore, as a general policy, only very light repairs are made in a station; parts requiring major repairs are replaced with tested units. In the case of the car body, the same policy is maintained. Seats, sash, doors, etc., in need of repairs must be replaced from material furnished by the body overhauling department.

Methods of Storing Replacement Units in the Shops of the New Orleans Public Service, Inc.

1. Section of the electrical repair room showing a number of extra armatures and field coils.
2. Removing motors and disassembling trucks at the Carrollton shop. Extra motors for substitution are stored in the corner at the extreme right of this view.
3. Wheel and axle units at the Magazine shop, ground and ready for replacement.
4. Extra air compressors with motors and railway motors ready to replace worn units.
5. One of the racks in the babbitting room where bearings are stored.

Digitized by Google

Extra Units Carried by the New Orleans Public Service, Inc., for Replacement

TRUCKS

Complete trucks
- 3 pair 76-E-2.
- 2 pair 39-E.
- 2 pair MCB.

Wheels
- 2 pair drivers for 76-E trucks with GE-263 motors.
- 2 pair drivers for 76-E-2 trucks with Westinghouse 306 motors.
- 4 pair idlers for 76-E-2 trucks.
- 4 pair drivers for 39-E trucks with GE-201 motors.
- 4 pair pony wheels for 39-E trucks.
- 2 pair drivers for MCB trucks with Westinghouse 306 motors.
- 2 pair drivers for MCB trucks with GE-263 motors.
- 4 pair idlers for MCB trucks.
- 1 pair drivers for Lord Baltimore trucks with Westinghouse 514 motors.

Miscellaneous truck parts
- 3 sets journal boxes for 76-E-2 trucks.
- 8 sets pony boxes for 39-E-2 trucks.
- 12 pair axle bearings, babbitt lined, for GE-263 motors.
- 10 journal bearings for 76-E-2 trucks.
- 5 brasses for pony wheels of 39-E-2 trucks.
- 2 MCB truck bolsters.
- 2 body bolsters.

Several suspension bars for motors.
Brake equipment under separate head.

MOTORS AND CONTROL

Complete motors
- 12 Westinghouse 306-CB-4.
- 8 GE-263-A.
- 8 GE-57.
- 6 Westinghouse 514.
- 2 GE-247.
- 4 Westinghouse 510.
- 4 GE-265.

Armatures
- 2 Westinghouse 306-CB-4.
- 2 GE-263-A.
- 4 GE-57.

Armature bearings
- 6 pair for Westinghouse 306 motors.
- 6 pair for GE-263 motors.
- 2 pair for GE-57 motors.

Brush holders
- 6 for Westinghouse 306 motors.
- 6 for GE-263 motors.
- 8 for GE-57 motors.
- 3 for Westinghouse 514 motors.
- 3 for GE-247 motors.

Gear cases
- 4 for Westinghouse 306 motors.
- 2 for GE-263 motors.
- 4 for GE-201 motors.

Extra bottom halves.

Control
- 2 K-35 JJ controllers.
- 14 K-36 controllers.
- 1 set edge-wound resistance for GE-265 motors.
- 2 sets resistors for Westinghouse 306 motors.

Few sets miscellaneous resistors.

BRAKE EQUIPMENT

Valves
- 1 M-24 air valve.
- 12 PV air valves.
- 6 SL-1 air valves.
- 5 M-1 tripper valves.
- 5 M-1-2A tripper valves.
- 1 reducing valve.
- 1 No. 14 double check valve.

Air compressors and motors
- 4 General Electric CP-27.
- 2 Westinghouse DH-16.
- 2 Westinghouse D-1-H.

Miscellaneous brake equipment
- 3 compressor cylinders, 8x12 in.
- 20 compressor cylinders, 10x12 in.
- 4 jam cylinder piston rods.
- 6 Westinghouse S-6 air governors.
- 1 General Electric ML air governor.
- 1 Westinghouse S-16 air governor.
- 6-31 brake shoes (25 ordered when supply reaches 6).
- 8 slack adjusters.

Several brake levers, rods, equalizers and other parts of the brake rigging.

ELECTRICAL AND BODY

Overhead line breakers
- 10 General Electric MR-12.
- 10 Westinghouse 6-11-A.
- 5 General Electric MR-22-A.

Line breakers
- 5 General Electric 976.
- 5 Westinghouse 801-E.
- 3 General Electric DB-987.
- 1 Westinghouse UM-2-A.

Lightning arrester jars
- 12 sets for General Electric 2-cell aluminum arresters.
- 12 sets for Westinghouse LA aluminum arresters.

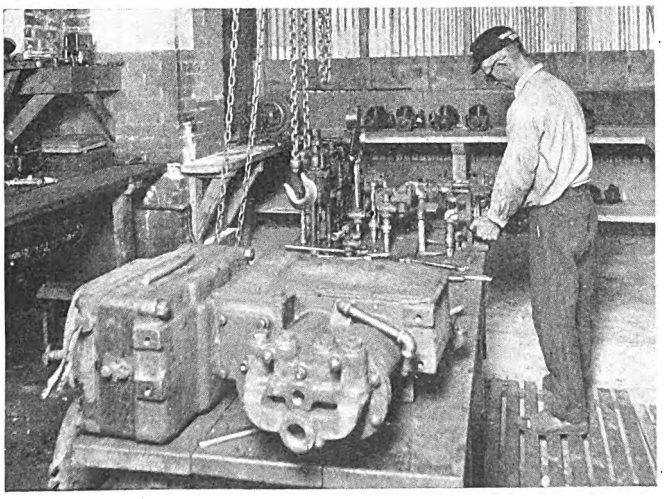
Miscellaneous
- 2 complete sets of lightning arresters.
- 12 Ohio Brass trolley catchers.
- 6 National Pneumatic door engines.
- 1 fender.
- 2 H-B life guards.

Many miscellaneous smaller parts, ordered from storeroom.

One class of work that is still carried on in the stations is the grinding of wheels. Wheels are changed at the station because this work can be done in a fraction of the time required for sending a car to the overhauling shop. Other work carried on by the stations besides the 1,000-mile inspection and the grinding of wheels consists of car oiling, cleaning, washing, emergency wrecker service, sanding and sprinkling.

From the foregoing it should not be thought that a great many equipment units require replacement in the stations. In reality, there is very little of this type of work done. Extra units are carried only to insure that cars are not sent out with equipment that is likely to fail. Why there are few replacements of equipment units due to failure is answered by the thorough method of overhaul.

All equipment changes made at the stations are reported to the superintendent's office on an "equipment change report," one of which is shown in an accompanying illustration. In this way a close check is maintained on all changes in equipment due to failure. This same form is used by the overhauling department. By triplicating the reports a complete record of the equipment on every car is maintained at the superintendent's office, the overhauling department and at the station.



Air compressors, governors, valves and other air equipment are overhauled in this room and held in reserve

All overhauling work is divided into two parts: first, car equipment overhauling, and second, car body overhauling and painting. Car equipment is overhauled on a 40,000 car-mile basis, the work being done at the Carrollton shop; car bodies are overhauled on an eighteen to twenty months' schedule, the work being done at the Magazine shop.

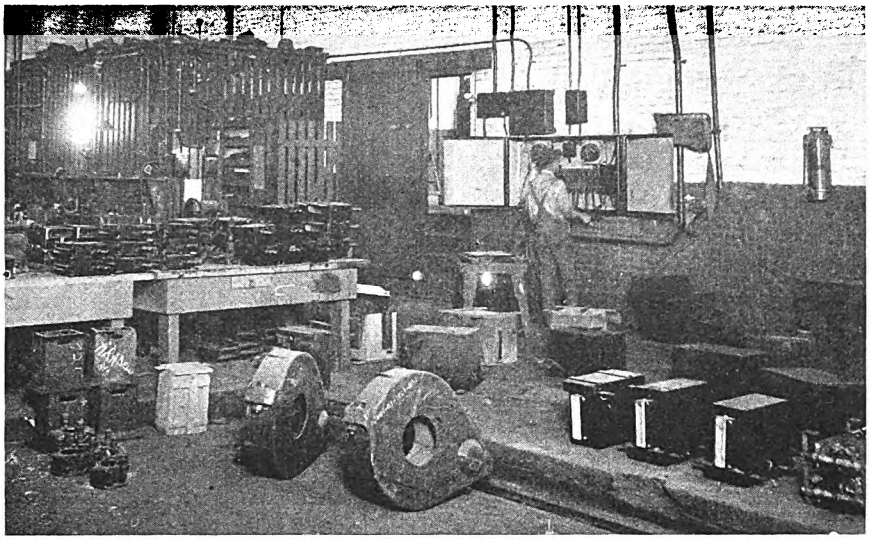
When a car has completed its 40,000 miles of service, it is sent to the car equipment overhauling department by order of the superintendent. This department is handled by a foreman who is responsible for the supervision of the shop employees. A shop engineer works with him and is responsible for the electrical or mechanical testing of every piece of equipment on an overhauled car, and for the general performance of the car itself. Records are kept of the mileage of the cars and they are summoned for overhaul at approximately the 40,000-mile mark, but the exact figure depends on conditions at the shop. By watching the records and properly summoning cars, an even flow is maintained through the shop.

When a car is received the following equipment is removed for overhaul: trucks with motors, air compressors, air governors, air equipment boxes, jam cylinders, door engines, slack adjusters, air intake strainers, line breakers, circuit breakers, lightning arresters, rheostats, trolley bases and trolley catchers. Other equipment, which may require removal for overhaul, depending on its condition, consists of motorman's brake valves, air reservoirs, air gages, miscellaneous air valves, controllers, buzzers, life guards, door and step mechanism, register rods and straps, foot gongs, stanchions or grab handles, handstraps, motorman's steps and headlights. In general,

Digitized by Google

every piece of equipment must be gone over thoroughly.

Although most of the above parts are removed at each overhaul, because of the use of the unit replacement system, it is not necessary to hold the car until all of this original equipment is ready to be reassembled. As many extra parts as possible that have previously been overhauled are placed on the car and work concentrated on those units which are not replaceable. By this method the overhauling can be done on a steady production basis, permitting the cars to be quickly re-equipped with tested units. In an accompanying table are listed some of the many extra units which are retained as surplus parts at the Carrollton shop. As will be noted a sufficient number are kept to allow a great amount of flexibility in the overhaul work. Since the maintenance methods used by the New Orleans Public Service have been described in detail in previous articles in the JOURNAL they will not be outlined here. It is sufficient to say that all overhaul work is conscientiously and thoroughly done. The activities of this department are extremely detailed and are followed up continuously by the shop foreman and the shop engineer.



Section of the electrical equipment department where line breakers, circuit breakers, lightning arresters and other apparatus are overhauled

In reality the overhauling of a car body every eighteen to twenty months is a light overhaul and is classified as a "touch-up and varnish" job. At this time the doors, vestibule sash, side sash, seat bottoms, side curtains, motorman's curtains, sign box curtains, registers, register straps and bell ropes are removed from the car. Necessary carpenter work is done on the car body, after which it is painted. Removed doors, sash and seat bottoms are repaired if necessary and painted, curtains are given attention, registers overhauled, and register straps and bell ropes replaced if necessary.

When the condition of the car body requires a general overhaul, all equipment is stripped from the car, the necessary sheet metal or carpenter work is done, the old paint is burned off, and the paint surface restored, this job requiring about twelve days.

In the car body overhauling, as in the mechanical and electrical equipment overhauling, as many repaired units are substituted as is possible, in order to reduce the period of inactive service to a minimum.

Buses of the New Orleans Public Service, Inc., are inspected on four bases: daily, every 2,000 miles, every 20,000 miles and every 40,000 miles. No parts are replaced on the bus following the daily inspection, unless some serious defect is found. On the 2,000-mile inspection also all parts are examined and gone over carefully, but none replaced unless necessary. On the 20,000-mile inspection, however, a number of parts are replaced with overhauled and tested units. Among these are the vacuum tank, distributor, cylinder heads, junk heads, lighting generator, starter and horn.

In making the regular 40,000-mile inspection a still greater number of units are replaced. No individual parts of the engine are removed; the entire engine is taken out and replaced. Other units which are replaced with rebuilt ones are the steering gear, gas tank, clutch, transmission, air compressor, lighting generator, starter and horn. On the gas-electric buses the generator and driving motors are replaced with dipped, baked and tested units. Carrying the unit replacement system still further in the overhaul work, the company replaces a number of units with rebuilt ones, even in overhauling its bus engines. Among these units are the cylinder heads, water pump, carburetor and distributor or magneto.

EQUIPMENT CHANGE REPORT

NEW ORLEANS PUBLIC SERVICE INC.
ROLLING STOCK AND SHOPS DEPARTMENT

CAR No.:_____ MILEAGE:_____

STATION_____ DATE:_____

MOTORS

REMOVED						REPLACED BY			
TYPE	SERIAL No. FRAME	SERIAL No. ARMATURE	CAUSE OF REMOVAL	DATE	END No.	TYPE	SERIAL No. FRAME	SERIAL No. ARMATURE	DATE

RESISTORS

REMOVED					REPLACED BY		
TYPE	SERIAL No.	CAUSE OF REMOVAL	DATE	END No.	TYPE	SERIAL No.	DATE

CONTROLLERS

CIRCUIT BREAKERS

LINE BREAKER

LIGHTNING ARRESTER

AIR COMPRESSOR

GOVERNOR

MOTORMAN'S BRAKE VALVES

TRUCKS

REGISTERS

DOOR ENGINES

MISCELLANEOUS

Returned to_____ Station Date:_____

Per:_____ Repair Foreman. Checked by:_____ Engineer.

All equipment changes made in the five stations and the Carrollton shop are reported on the above form

Digitized by Google

1929 Was a GOOD YEAR

Gross and net revenues are holding steady, and on a large proportion of properties there has been an increase of business over 1928. Analysis of annual reports from 65 companies in this country and abroad presents significant operating statistics

LAST year was a good one from the standpoint of electric railway operation. This is becoming more and more apparent as the annual reports of the properties become available. While there have been few outstanding increases in revenue, there have been few declines. Many companies have had an actual increase in passengers carried, although others have suffered losses varying in amount. The most marked result, however, is a reduction in operating expense that practically offsets losses in gross on the various properties, so that the net operating revenue is as good as or better than it was in the preceding year.

Up to the present time 65 reports for the calendar year 1929 or for various periods terminating within the year have become available. Sixty of these are for electric railway properties in the United States and Canada. Taken together, they present a fair average of the financial results of the year. In size the companies range from small properties, some with considerably less than $1,000,000 operating revenue, to the largest in the country. Of the 60 companies in the United States and Canada, twelve had revenues of less than $1,000,000, 33 had revenues of $1,000,000 to $10,000,000, and fifteen had revenues in excess of the larger figure. Only those companies operating railway or bus lines exclusively, or those larger utilities which present separate reports for their railway departments, are included in Table I. The entire survey, therefore, covers local transportation lines only.

The reports as published differ widely in form, depending on the primary purpose for which they were prepared. Most of them follow the standard accounting form, and this has been adopted for the presentation in the tables, as it was in the analysis of reports presented in this paper last year. Some of the others, which did not follow this form exactly, could be brought in line with little difficulty. In this way they have been made fairly comparable. In some instances comparisons between 1929 and the preceding year were not available in the latest report. However, they were presented in previous reports and have been included for comparison. In a few instances the cumulated monthly reports have been used as the source of the figures. These are subject to minor adjustments, but the totals will be affected but little.

One significant fact that stands out in analyzing the figures is that there was no marked change in revenue for the year, as compared with the preceding period. Despite all difficulties these 60 companies were able to take in revenues that in the aggregate differed but little from those of the previous year. This is the more worthy of note, in that companies of all sizes were con-

Table I—Condensed Financial Reports of Electric Railway Properties, 1929-1928

	Glendale & Montrose Ry., Glendale, Cal.		Petaluma & Santa Rosa R.R., Petaluma, Cal.		Market Street Railway, San Francisco, Cal.		Municipal Railway, San Francisco, Cal.		Denver Tramway Corp., Denver, Col.	
	1929	1928	1929	1928	1929	1928	1929[2]	1928[2]	1929	1928
Railway operating revenue	$80,018	$81,505	$511,088	$595,281	$9,590,194	$9,754,461	$3,499,703	$3,477,665	$4,214,297	$4,310,040
Railway operating expenses	92,976	95,336	418,661[1]	473,453[1]	8,041,926[1]	8,327,688[1]	3,469,118	3,362,293	2,902,564	2,852,496
Net revenue, railway oper.	*$12,957*	*$14,831*	.....	.....	.....	.....	$30,584[3]	$115,372[3]	$1,311,733	$1,457,544
Taxes	4,452	3,801	.....	.....	.....	.....			494,201	506,504
Operating income	*$17,410*	*$18,632*	$92,427	$121,828	$1,548,268	$837,513	$30,584	$115,372	$817,532	$951,040
Non-operating income	1,560	1,302	13,291	11,469	.....	.....	34,277	88,448	46,888	39,077
Gross income	*$15,850*	*$16,330*	$105,718	$133,297	$1,548,268	$837,513	$64,861	$203,820	$864,420	$990,118
Deductions from gross income	.....	.....	36,111	36,890	.....	.....	153,486	163,262	513,283	529,158
Net income	.....	.....	$69,607	$96,407	$837,513[16]	$677,755[16]	*$88,624*	$40,558	$351,137	$460,960
Operating ratio	1.162	1.169	.....	.....	.....	.....	0.991	0.966	0.688	0.662

	Connecticut Company, New Haven, Conn.		Capital Traction Co., Washington, D. C.		Washington Ry. & Electric Co., Washington, D. C.		Jacksonville Traction Co., Jacksonville, Fla.		Honolulu Rapid Transit Co., Honolulu, T. H.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$13,399,101	$13,734,222	$4,296,906	$4,344,148	$5,789,979	$5,783,826	$1,141,139	$1,199,516	$1,063,167	$1,087,504
Railway operating expenses	10,546,906	10,759,127	3,067,371	3,054,981	4,787,343[1]	4,731,042[1]	928,589	971,149	737,800	752,531
Net revenue, railway oper.	$2,852,195	$2,975,095	$1,229,534	$1,289,167	.....	.....	$212,550	$228,367	$325,367	$334,972
Taxes	678,174	725,357	327,591	346,965	.....	.....	108,890	106,774	105,832	147,282
Operating income	$2,174,021	$2,249,738	$901,943	$942,202	$2,610,738[17]	$2,484,151[17]	$103,657	$121,591	$219,535	$187,690
Non-operating income	146,046	154,641	26,868	31,924	.....	.....	*6,125*	*6,437*	2,012	2,458
Gross income	$2,320,067	$2,404,379	$928,811	$974,126	$2,610,738	$2,484,151	$97,532	$115,154	$221,547	$190,149
Deductions from gross income	1,289,727	1,373,431	366,837	353,720	699,503	750,196	157,953	164,018	6,600	6,600
Net income	$1,030,340	$1,030,948	$561,974	$620,406	$1,911,234	$1,733,967	*$60,420*	*$48,863*	$214,947	$183,549
Operating ratio	0.787	0.783	0.713	0.704	.....	.....	0.813	0.809	0.694	0.692

(See Page 207 for Footnotes)

Digitized by Google

for the Electric Railways

sidered. Referring to Table II, it will be seen that in general the largest companies had the greatest number of instances of increases in revenue. Eleven out of fifteen in this class showed gains. This was due to an actual increase in traffic on most of them, since there were relatively few changes in fare during the year. As would be expected, the greatest losses in revenue occurred on the smaller properties, three showing increases and nine showing losses. The medium-sized companies were almost evenly balanced in comparative earnings with the year previous, sixteen taking in more gross and seventeen less.

The most marked effect in the year just past is the reduction in operating expense. Economies were effected in companies in all the classifications. It is rather remarkable, however, that the most marked savings in operation took place in both the largest and the smallest groups. Of the small companies, only two increased their expenses, while ten were able to reduce them.

Table II—Significant Changes in Operation, 1928-1929 Classified According to Size of Properties

	Annual Gross Revenue			
	Less than $1,000,000	$1,000,000 to $10,000,000	More than $10,000,000	Grand Total
Total number of companies	12	33	15	60
Gross revenue:				
Increased in 1929	3	16	11	30
Decreased in 1929	9	17	4	30
Operating expenses:				
Increased in 1929	2	16	4	24
Decreased in 1929	10	17	11	36
Operating income:				
Increased in 1929	8	15	11	34
Decreased in 1929	4	18	4	26

Table III—Range of Operating Ratios in 1929, Arranged According to Size of Properties

	Annual Gross Revenue			
	Less than $1,000,000	$1,000,000 to $10,000,000	More than $10,000,000	Grand Total
Total number of companies	12	33	15	60
Range of operating ratios:				
Above 1.00	1	0	0	1
0 90-1 00	1	1	0	2
0 80-0 90	1	6	1	8
0 70-0 80	2	11	9	22
Below 0 70	2	6	3	11
Figures not available	5	9	2	16

Table I—(Continued)—Condensed Financial Reports of Electric Railway Properties, 1929-1928

	Chicago North Shore & Milwaukee R.R., Chicago, Ill.		Chicago Rapid Transit Co., Chicago, Ill.		Chicago Surface Lines, Chicago, Ill.		Chicago & West Towns Ry., Oak Park, Ill.		Gary Railways, Gary, Ind.	
	1929	1928	1929	1928	1930[7]	1929[7]	1929	1928	1929	1928
Railway operating revenue	$8,020,762	$7,967,186	$21,106,491	$19,995,277	$62,717,867	$62,391,622	$1,567,333	$1,515,529	$1,293,442	$1,240,522
Railway operating expenses	5,913,692	5,928,425	14,772,550	14,238,630	46,015,703	45,401,067	1,160,977[1]	1,124,543[1]	1,051,769[11]	970,534
Net revenue, railway oper.	$2,107,070	$2,038,762	$6,333,941	$5,756,647	$16,702,164	$16,990,555	.....	.....	$241,673	$269,988
Taxes	380,086	395,596	1,848,611	1,843,112	3,235,000	3,560,000	.....	.....	59,248	63,113
Operating income	$1,787,612[18]	$1,702,768[18]	$4,485,330	$3,913,535	$13,467,164[8]	$13,430,555[8]	$406,356	$390,986	$182,424	$206,875
Non-operating income	380,711	426,467	267,098	268,975	.....	.....	.....	.....	6,886	2,416
Gross income	$2,168,323	$2,129,234	$4,752,428	$4,182,510	.....	.....	$406,356	$390,986	$189,311	$209,291
Deductions from gross income	1,445,257	1,347,513	3,682,948	3,540,195	.....	.....	177,368	153,051	118,295	118,609
Net income	$723,065	$781,721	$1,069,479	$642,314	.....	.....	$228,988	$237,935	$71,015	$90,681
Operating ratio	0.737	0.744	0.700	0.712	0.733	0.728	.....	.....	0.815	0.780

	Indianapolis, Crawfordsv. & Danville E. Ry., Indianapolis, Ind.		Indianapolis & Martinsville R. T. Co., Indianapolis, Ind.		Indianapolis & Northwestern Trac. Co., Indianapolis, Ind.		Indianapolis Street Ry., Indianapolis, Ind.		Terre Haute, Indpls. & E. Trac. Co., Indianapolis, Ind.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$230,129	$267,117	$136,035	$139,362	$364,331	$411,387	$5,044,817	$5,213,775	$5,050,541	$5,122,184
Railway operating expenses	239,369[1]	284,942[1]	142,823[1]	163,802[1]	372,958[1]	452,139[1]	3,688,857	3,857,220	3,739,314[1]	4,119,917[1]
Net revenue, railway oper.	.....	.....	.....	.....	.....	.....	$1,355,960	$1,356,555	.....	.....
Taxes	.....	.....	.....	.....	.....	.....	308,313	289,303	.....	.....
Operating income	*$9,240*	*$17,825*	*$6,788*	*$24,440*	*$8,627*	*$40,752*	$1,047,647	$1,067,252	$1,311,227	$1,002,267
Non-operating income	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gross income	*$9,240*	*$17,825*	*$6,788*	*$24,440*	*$8,627*	*$40,752*	$1,047,647	$1,067,252	$1,311,227	$1,002,267
Deductions from gross income	59,500	59,500	38,000	38,000	124,000	124,000	640,037	663,839	1,151,660	1,128,518
Net income	*$68,739*	*$77,325*	*$44,788*	*$62,439*	*$132,627*	*$164,753*	$407,610	$403,413	$159,567	*$126,251*
Operating ratio	.....	.....	.....	.....	.....	.....	0.731	0.739	.....	.....

	Chicago, South Shore & S. Bend R.R., Michigan City, Ind.		Louisville Railway, Louisille, Ky.		Androscoggin & Kennebec Ry., Lewiston, Me.		United Rys. & Elec. Co. of Baltimore, Baltimore, Md.[14]		Washington, Balto.- & Annapolis Elec. Ry., Baltimore, Md.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$3,691,578	$3,060,539	$4,820,901	$4,847,000	$784,548	$822,922	$16,717,099	$16,273,806	$2,537,511	$2,488,236
Railway operating expenses	3,043,742	2,536,527	3,465,693	3,494,755	684,343	680,943	11,335,024	10,873,921	2,019,485	1,864,024
Net revenue, railway oper.	$647,835	$524,011	$1,355,208	$1,352,244	$100,205	$141,979	$5,382,075	$5,399,884	$518,026	$624,212
Taxes	60,817	51,403	461,000	462,268	20,487	29,356	1,635,733	1,578,782	139,888	131,271
Operating income	$587,017	$472,608	$894,208	$889,976	$79,718	$112,622	$3,746,342	$3,821,102	$378,138	$482,941
Non-operating income	60,246	45,262	89,666	86,107	.....	.....	175,591	150,823	5,911	11,009
Gross income	$647,264	$517,870	$983,874	$976,084	$79,718	$112,622	$3,921,934	$3,971,926	$384,050	$503,950
Deductions from gross income	227,974	517,286	639,720	643,032	68,275	68,560	3,387,077	3,413,532	585,459	561,279
Net income	$419,290	$583	$344,154	$333,051	$11,443	$44,062	$534,856	$558,394	*$201,409*	*$57,329*
Operating ratio	0.823	0.829	0.719	0.721	0.872	0,827	0.678	0.667	0.796	0.748

(See Page 207 for Footnotes)

Digitized by Google

Among the large companies, eleven out of the fifteen reduced their operating costs. The medium-sized group, where it might be expected large savings could be effected, showed correspondingly less gain in this direction, seventeen having lower costs and sixteen higher. Altogether, 36 out of the 60 properties were able to effect reductions in total operating expense.

That the combination of increased earnings on many properties and operating economies on them and on some of the others where business declined was effective

Table I—(Continued)—Condensed Financial Reports of Electric Railway Properties, 1929-1928

	Boston Elevated Railway Boston, Mass.		Boston, Revere Beach & Lynn R.R., Boston, Mass.		Eastern Massachusetts St. Ry., Boston, Mass.		Fitchburg & Leominster St. Ry., Fitchburg, Mass.		Union Street Railway, New Bedford, Mass.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$34,096,623	$34,843,147	$1,271,014	$1,222,093	$8,579,454	$9,005,758	$338,463	$353,771	$1,283,222	$1,286,624
Railway operating expenses	24,024,747	24,900,188	1,002,418	1,068,548	6,358,654	6,714,403	309,778[13]	264,316[1]	1,120,118	1,165,964
Net revenue, railway oper.	$10,071,876	$9,942,959	$268,596	$153,544	$2,220,799	$2,291,354	$28,685	.....	$163,104	$120,660
Taxes	1,619,962	1,721,678	33,769	43,896	351,182	364,759	5,333	.....	61,059	58,713
Operating income	$8,451,914	$8,221,281	$234,827	$109,648	$1,869,616	$1,926,595	$23,351	$89,455	$1,020,045	$61,947
Non-operating income	.....	.....	2,854	2,843	229,744	242,360	.....	.....	1,361	1,251
Gross income	$8,451,914	$8,221,281	$237,681	$112,591	$2,099,361	$2,168,955	$23,351	$89,455	$103,406	$63,198
Deductions from gross income	8,357,842	8,181,230	147,161	50,696	1,098,658	1,176,166	18,748	86,807[13]	16,180	12,465
Net income	$94,072	$40,051	$90,520	$61,894	$1,000,703	$992,789	$4,603	$2,648	$87,223	$50,733
Operating ratio	0.706	0.715	0.788	0.874	0.741	0.746	0.915	.....	0.873	0.906

	Middlesex & Boston St. Ry., Newtonville, Mass.		Department of Street Railways, Detroit, Mich.		Grand Rapids Railroad, Grand Rapids, Mich.		Duluth-Superior Traction Co., Duluth, Minn.		Twin City Rapid Transit Co., Minneapolis, Minn.	
	1929	1928	1929[15]	1928[15]	1929	1928	1929	1928	1929	1928
Railway operating revenue	$1,164,390	$1,176,281	$26,444,874	$24,668,175	$1,555,166	$1,574,170	$1,780,428	$1,873,330	$13,487,976	$13,005,353
Railway operating expenses	1,003,534[1]	999,032[1]	21,057,542	19,283,497	975,116	957,624	1,476,498	1,535,169	9,930,434	9,950,552
Net revenue, railway oper.	.....	.....	$5,387,332	$5,384,677	$580,050	$616,546	$303,929	$338,160	$3,557,542	$3,054,801
Taxes	.....	.....	750,948	783,012	128,422	133,617	147,770	153,561	1,201,924	1,098,849
Operating income	$160,856	$177,249	$4,636,383	$4,601,664	$451,627	$482,929	$156,159	$184,599	$2,355,618	$1,955,952
Non-operating income	.....	.....	118,396	245,586	.....	.....	25,579	33,794	121,978	99,281
Gross income	$160,856	$177,249	$4,754,779	$4,847,251	$451,627	$482,929	$181,739	$218,393	$2,477,596	$2,055,233
Deductions from gross income	156,367	160,693	1,651,590	1,914,896	235,915	240,914	168,983	169,171	1,221,718	1,221,643
Net income	$4,489	$16,556	$3,103,189	$2,932,355	$215,712	$242,014	$12,756	$49,222	$1,255,878	$833,590
Operating ratio	0.862	0.849	0.796	0.782	0.627	0.609	0.830	0.819	0.735	0.765

	Kansas City Public Service Co., Kansas City, Mo.		Illinois Terminal Co., St. Louis, Mo.		St. Louis Public Service Co., St. Louis, Mo.		Public Service Co-ordinated Transport, Newark, N. J.		International Railway, Buffalo, N. Y.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$8,951,616	$8,490,282	$7,163,425	$6,717,136	$19,249,779	$19,451,917	$34,732,658	$34,719,509	$10,975,851	$11,116,652
Railway operating expenses	7,327,003[1]	6,242,470	5,025,476	4,902,473	14,326,528	14,616,828	28,588,849[1]	29,268,099[1]	8,291,542	8,336,905
Net revenue, railway oper.	.....	$2,247,812	$2,137,949	$1,814,663	$4,923,251	$4,835,089	.....	.....	$2,684,309	$2,779,748
Taxes	.....	505,530	264,072	305,320	1,922,814	1,885,450	.....	.....	744,601	749,918
Operating income	$1,624,613	$1,621,456[19]	$1,873,744	$1,509,255	$2,954,059[20]	$2,876,247[20]	$6,143,809	$5,451,410	$1,939,707	$2,029,829
Non-operating income	.....	.....	.....	.....	51,304	40,319	144,166	150,842	92,621	56,912
Gross income	$1,624,616	$1,621,456	$1,374,551[12]	$1,066,786[12]	$3,005,363	$2,916,566	$6,287,975	$5,602,253	$2,032,329	$2,086,742
Deductions from gross income	926,393	875,973	.....	.....	1,849,902	1,873,165	6,531,227	5,779,373	1,291,128	1,352,998
Net income	$698,223	$745,432	.....	.....	$1,155,461	$1,043,401	*$243,251*	*$177,120*	$740,200	$733,744
Operating ratio	.....	0.735	0.701	0.729	0.744	0.751	.....	.....	0.754	0.750

	Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.		Hudson & Manhattan R.R., New York, N. Y.		Long Island Railroad, New York, N. Y.		New York, Westchester & Boston Ry., New York, N. Y.		Staten Island Rapid Transit Co., New York, N. Y.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$1,025,933	$1,036,155	$12,517,756	$12,388,927	$41,326,194	$40,532,572	$2,530,488	$2,390,398	$2,637,897	$3,127,661
Railway operating expenses	760,871	749,352	6,248,096[1]	6,425,643[1]	27,734,679	28,434,357	1,570,218	1,622,858	1,892,347	2,103,175
Net revenue, railway oper.	$265,061	$286,803	.....	.....	$13,591,515	$12,098,215	$960,270	$767,540	$745,550	$1,024,486
Taxes	70,775	75,963	.....	.....	2,922,226	2,688,837	275,817	239,672	210,265	225,874
Operating income	$194,285	$210,839	$6,269,659	$5,963,283	$10,649,328	$9,390,508	$684,452	$527,868	$535,285	$798,612
Non-operating income	122,767	101,705	.....	.....	.....	.....	12,460	12,653	.....	.....
Gross income	$317,053	$312,545	$6,269,659	$5,963,283	$8,707,943[12]	$7,542,458[12]	$696,912	$540,522	$460,515[12]	$349,650[12]
Deductions from gross income	381,130	382,786	4,022,449	4,022,226	.....	.....	2,667,847	2,448,950	.....	.....
Net income	*$64,077*	*$70,240*	$2,247,210	$1,941,057	.....	.....	*$1,970,935*	*$1,908,428*	.....	.....
Operating ratio	0.741	0.723	.....	.....	0.671	0.702	0.621	0.679	0.719	0.672

	Cleveland Railway, Cleveland, Ohio		Community Traction Co., Toledo, Ohio		Altoona & Logan Valley Elec Ry., Altoona, Pa.		Fairmount Park Transit Co., Philadelphia, Pa.		Philadelphia Rapid Transit Co., Philadelphia, Pa.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$18,403,945	$18,272,040	$3,887,020	$3,691,071	$1,229,007	$1,246,361	$338,032	$487,366	$55,909,553	$55,835,522
Railway operating expenses	15,685,627	15,065,213	2,819,610	2,565,165	813,123[1]	862,930[1]	239,619	391,114	38,666,747	38,935,149
Net revenue, railway oper.	$2,718,317	$3,206,826	$1,067,410	$1,125,906	.....	.....	$98,413	$96,252	$17,242,806	$16,900,372
Taxes	1,210,870	1,261,527	235,331	230,356	.....	.....	26,794	27,698	3,310,797	3,402,066
Operating income	$1,507,447	$1,945,299	$832,079	$895,550	$415,884	$383,431	$71,619	$68,554	$13,932,008	$13,498,306
Non-operating income	171,857	275,707	.....	.....	.....	.....	.....	.....	1,243,331	1,390,208
Gross income	$1,679,304	$2,221,007	$832,079	$895,550	$415,884[6]	$383,431[6]	$71,619	$68,554	$15,175,339	$14,888,514
Deductions from gross income	2,512,754	2,530,953	363,268	321,929	182,150	183,693	24,511	26,313	10,837,831	11,361,425
Net income	*$833,449*	*$309,946*	$468,810[9]	$573,620[9]	$233,734	$199,738	$47,108	$42,241	$4,337,508	$3,527,089
Operating ratio	0.852	0.824	0.725	0.695	.....	.....	0.709	0.802	0.691	0.697

(See Page 207 for Footnotes)

Digitized by Google

is seen from the change in operating income. Among the 60 companies, 34 were able to show a greater operating income after deducting operating expenses and taxes. In this figure lies the real measure of effectiveness of the operating policy followed for the year. Again it is significant that the groups containing the largest and the smallest railways are the ones which had the greatest gains in net. Eight of the twelve small companies made a better showing in this respect than they did in 1928, and eleven of the fifteen large companies showed similar gains. In the middle group, fifteen companies showed gains and eighteen showed reductions from 1928.

Operating ratios fall within a range not far different from that indicated last year. Only one small company had an operating ratio of more than 1.00. Three small companies for which operating expenses and taxes are not separated were not able to cover both these items of expense out of revenue. They are part of a larger system which as a whole was able to pay expenses by a considerable margin. The remaining 56 companies analyzed were able to pay operating expenses out of receipts. One small and one medium-sized company had operating ratios between 0.90 and 1.00. Thus 41 out of 44 companies for which information was available were able to keep their operating ratios below 0.90. This speaks well for the efficiency of management. At that, only one small, one large, and six middle sized properties had higher than 0.80 for the operating ratio.

Although it sometimes has been questioned whether the small companies are able to operate efficiently, two of those with receipts of less than $1,000,000 were able to operate at less than 0.70. These are both interurban railways, the Galveston-Houston Electric Railway, with a ratio of 0.563, and the Charleston Interurban Railroad, with 0.614. The six companies with ratios below 0.70 in the middle class are the Denver Tramway, 0.688; the Honolulu Rapid Transit Company, 0.694; the Grand Rapids Railroad, 0.627; the New York, Westchester &

Table I—(Continued)—Condensed Financial Reports of Electric Railway Properties, 1929-1928

	United Electric Railways, Providence, R. I.		Dallas Ry. & Terminal Co., Dallas, Tex.		Texas Electric Railway, Dallas, Tex.		Galveston-Houston Electric Ry., Houston, Texas		Houston Electric Co., Houston, Texas	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$7,421,195	$7,423,475	$3,319,132	$3,260,569	$1,866,307	$1,825,753	$584,490	$643,800	$3,375,857	$3,343,294
Railway operating expenses	6,423,874[1]	6,482,551[1]	2,329,455[1]	2,479,277[1]	1,177,584	1,121,438	329,020	373,360	2,085,804	2,059,957
Net revenue, railway oper.	.....	.....	.....	.....	$688,723	$704,315	$255,470	$270,440	$1,290,053	$1,283,337
Taxes	.....	.....	.....	.....	69,567	65,855	32,356	31,768	273,926	291,672
Operating income	$920,876	$940,924	$989,677	$781,292	$619,156	$638,459	$223,113	$238,671	$1,016,125	$991,664
Non-operating income	86,630.	86,559	.....	.....	.....	.....	193	.....	11,730	.....
Gross income	$1,007,506	$1,027,483	$989,677	$781,292	$619,156	$638,459	$223,306	$238,671	$1,027,859	$991,664
Deductions from gross income	610,269	616,886	879,961	.....	417,865	417,877	269,960	269,809	398,669	410,701
Net income	$397,237	$410,597	$109,716	.....	$201,291[4]	$220,582[4]	*$46,654*	*$31,138*	$629,190	$580,963
Operating ratio	.....	.....	.....	.....	0.631	0.615	0.563	0.579	0.618	0.616

	Pacific Northwest Traction Co., Seattle, Wash.		Charleston Interurban R.R., Charleston, W. Va.		Madison Railways, Madison, Wis.		Ottawa Electric Railway, Ottawa, Ont.		Montreal Tramways, Montreal, P. Q.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenue	$964,072	$881,076	$839,938	$800,460	$436,165	$439,865	$1,887,123	$1,855,907	$15,669,911	$14,938,678
Railway operating expenses	717,375	736,776	516,077	546,295	343,197[1]	349,250[1]	1,550,342[1]	1,314,349[1]	11,431,166	11,503,314
Net revenue, railway oper.	$246,697	$144,300	$323,861	$254,165	.....	.....	.....	.....	$4,238,745	.....
Taxes	54,176	51,644	79,416	79,416	.....	.....	.....	.....	476,342	.....
Operating income	$192,518	$92,654	$244,445	$174,749	.....	.....	$336,781	$541,558[4]	$3,762,403	$3,435,364
Non-operating income	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gross income	$192,518	$92,654	$244,445	$174,749	$92,968	$90,615	$336,781	$541,558[4]	$3,762,403	$3,435,364
Deductions from gross income	116,215	155,255	111,399	110,372	61,365	71,655	182,589	.....	3,634,086	2,935,364
Net income	$76,303	*$62,601*	$133,047	$64,377	$31,603	$18,960	$154,192	.....	$128,316	$500,000
Operating ratio	0.744	0.836	0.614	0.682	.....	.....	.....	.....	0.729	.....

	Havana Electric Ry., Havana, Cuba		Underground Electric Rys., London, England[10]		Christchurch Tramway Board, Christchurch, N. Z.		New South Wales Govt. Tramways, Sydney, N. S. W.		Melbourne & Metropolitan Tramways Bd. Melbourne, Vic., Aus.	
	1929	1928	1929	1928	1929[16]	1928[16]	1929[2]	1928[2]	1929[2]	1928[2]
Railway operating revenue	$5,694,051	$5,415,175	£15,097,592	£14,941,553	£265,363	£273,761	£4,457,890	£4,556,561	£2,435,548	£2,494,100
Railway operating expenses	4,608,568[1]	4,494,473[1]	12,288,229[1]	12,046,381[1]	183,462	193,962	3,835,644	3,937,356	1,704,678	1,722,967
Net revenue, railway oper.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Taxes	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Operating income	$1,085,483	$920,702	£2,809,363	£2,895,172	£82,101	£79,799	£622,246	£619,205	£730,870	£771,133
Non-operating income	31,457	39,171	1,080,003	1,052,917	.....	.....	.....	.....	.....	.....
Gross income	$1,116,940	$959,873	£3,889,366	£3,948,089	£82,101	£79,709	£622,246	£619,205	£730,870	£771,133
Deductions from gross income	643,360	643,951	2,738,940	2,774,902	69,258	82,970	631,589	591,397	345,885	325,955
Net income	$473,580[4]	$315,922[4]	£1,150,426	£1,173,187	£12,843	*£3,171*	*£9,343*	£27,808	£384,985	£445,178
Operating ratio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Italic figures indicate deficit.
[1]Includes taxes.
[2]Years ended June 30.
[3]For comparative purposes taxes are computed for 1929 at $332,402 and for 1928 at $328,116.
[4]Before depreciation.
[5]After deducting depreciation of $3,572,648 in 1929 and $2,907,939 in 1928.
[6]After depreciation.
[7]Years ended Jan. 31.
[8]Includes City's 55 per cent of divisible net receipts.
[9]These figures represent balance transferred to stabilizing fund. In 1929 after adjustment for taxes, power refund and payment of bond interest and dividends on preferred stock the net increase in stabilizing fund was $45,387; in 1928 after similar action the net increase in stabilizing fund was $125,150.
[10]Combined statement of "common fund" companies.
[11]Deduction of $64,335 for retirements from this amount was made in 1929.
[12]Net after equipment and joint facility rents.
[13]Includes depreciation.
[14]Subject to adjustments.
[15]Twelve-month statement for calendar year.
[16]Before depreciation and federal taxes; Years ended Mar. 31.
[17]Net revenue from auxiliary operations, $1,605,102 in 1929 and $1,431,367 in 1928.
[18]Net revenue from auxiliary operations, $6,628 in 1929 and $59,602 in 1928.
[19]Net deficit from auxiliary operations, $120,828.
[20]Net deficit from auxiliary operations, $46,377 in 1929 and $73,391 in 1928.

Digitized by Google

Table IV—Electric Railways or Controlled Bus Companies on Which the Passengers Carried in 1929 Exceeded Those in 1928

Company	Increase Per Cent 1929 Over 1928
Aurora, Elgin & Fox River Electric Company, Aurora, Ill.	2.81
Chicago & Joliet Electric Railway	3.98
Chicago Surface Lines	1.00
Illinois Northern Utilities Company, Freeport	10.37
Illinois Power & Light Corporation, Galesburg	1.48
Illinois Power & Light Corporation, Peoria	3.93
Chicago, South Shore & South Bend, Michigan City, Ind.	15.40
Gary Railways Company	4.86
Indiana Service Corporation, Ft. Wayne	8.54
Southern Indiana Gas & Electric Company, Evansville	1.22
Houghton County Traction Company, Houghton, Mich.	0.33
Saginaw Transit Company, Saginaw, Mich.	1.73
Public Service Co-ordinated Transport, Newark, N. J.	0.02
Salem & Penns Grove Traction Company	8.29
Manhattan & Queens Traction Corporation	1.59
Interborough Rapid Transit Company	3.94
New York Rapid Transit Corporation	3.84
Poughkeepsie & Wappingers Falls Railway	1.48
Third Avenue Railway System	3.39
Community Traction Company, Toledo	5.22
Dayton & Troy Electric Railway	11.14
Dayton & Western Traction Company	0.38
Ohio Public Service Company, Mansfield, Ohio	6.43
Pennsylvania-Ohio Public Service Company, Youngstown	0.56
Altoona & Logan Valley Electric Railway	1.00
Beaver Valley Motor Coach Company, New Brighton, Pa.	7.39
Beaver Valley Traction Company	0.79
Citizens Transit Company, Oil City, Pa.	16.07
East Penn Traction Company, Pottsville, Pa.	74.55
Lewistown & Reedsville Electric Railway	1.70
Pittsburgh Motor Coach Company	20.35
Milwaukee Electric Railway & Light Company	1.19
Northern States Power Company, Eau Claire, Wis.	10.55
Wisconsin Power & Light Company, Madison	4.83
Alabama Power Company	1.24
Atlanta Coach Company	14.67
Kentucky Utilities Company, Paducah	1.85
Gulfport & Mississippi Coast Traction Company	10.06
Lynchburg Traction & Light Company	0.99
Virginia Public Service Company, Hampton	1.60
Des Moines & Central Iowa Railroad	5.21
Des Moines Railway	5.08
Mason City & Clear Lake Railroad, Mason City, Iowa	6.71
Tri City Railway, Davenport, Iowa	8.70
Waterloo, Cedar Falls & Northern Railway	5.16
Mississippi Valley Public Service Company	3.62
Missouri Power & Light Company, Jefferson City	3.52
St. Joseph Railway, Light, Heat & Power Company	2.99
Butte Electric Railway	10.00
Utah Rapid Transit Company, Ogden	10.09
Northeast Oklahoma Railway, Miami, Oklahoma	21.74
Dallas Railway & Terminal Company	1.81
Eastern Texas Electric Company, Beaumont	14.89
El Paso Electric Company	6.56
Houston Electric Company	1.50
Texarkana Street Railway	5.41
Texas Electric Railway, Dallas	3.03
Pacific Electric Railway, Los Angeles	2.14
Yakima Valley Transportation Company	4.68
British Columbia Electric Railway, Vancouver	0.46
Hamilton Street Railway	7.46
Montreal & Southern Counties Railway, St. Lambert	0.0
Montreal Tramways	5.85
Nova Scotia Power & Light Company, Halifax	25.20
Niagara, St. Catherines & Toronto Railway	1.81
Quebec Railway, Light, Heat & Power Company	0.46
Sherbrooke Railway & Power Company	11.22
Toronto Transportation Commission	6.81
Winnipeg Electric Company	1.69

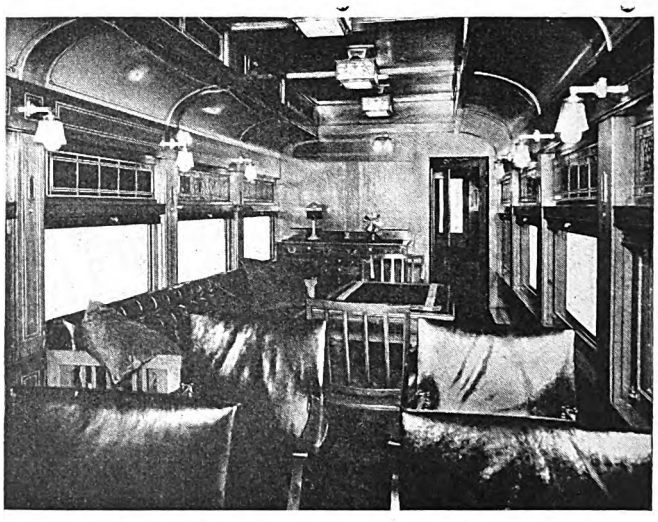
Boston Railway, 0.621; the Texas Electric Railway, 0.631, and the Houston Electric Company, 0.631. In this list are found railroads of widely differing types, including city, interurban and rapid transit. Among large systems operating in the low ratio class are the United Railways & Electric Company of Baltimore, 0.678; the Long Island Railroad, 0.671, and the Philadelphia Rapid Transit Company, 0.691. Here again is a wide variance in class of service.

Traffic Increase on Many Properties

That traffic increased on many electric railways is indicated by figures collected by the American Electric Railway Association for the past five years. From these it is found that there were increases in passenger traffic on 77 properties last year. Some few of these are not representative, since they are due in whole or in part to inclusion of additional lines purchased, or for other reasons have been excluded from consideration. The remaining companies are listed in Table IV, together with the per cent increase in traffic of 1929 over 1928. The gains range all the way from 0.02 to 74.55. As in the other figures, the gains are distributed over the small, medium and large properties. Some of the largest increases in traffic are on small systems. This indicates that the need for transportation, even in communities of minor importance, has not disappeared, and that there is an opportunity for improvement in small city systems and on certain of the interurban lines.

Private Car Converted for Parlor-Buffet Service

FOR the use of parties on chartered trips a private car of the Terre Haute, Indianapolis & Eastern Traction Company has been converted into a luxurious parlor-buffet car. Built several years ago, this car was recently rehabilitated in the company's shops and furnished with new draperies, linen and tableware. A large lounging compartment, library nook and front and rear observation platforms provide accommodations for 25 passengers. Large windows of circular glass reaching almost to the floor afford a clear view from both front and rear platform. In addition to leather upholstered easy chairs, the car is furnished with a long center table, folding card tables and several commodious divans. A small galley and pantry, containing an alcohol range, refrigerator, cupboard and serving table, is located at the center of the car, as is a lavatory. The car may be chartered for trips to any point on the T. H. I. & E. system or connecting electric lines for a minimum of 25 full fares. A porter is assigned to the car to prepare refreshments and attend to the needs of the passengers. The car is motorized and is operated as a single unit under ordinary circumstances. Illustrated circulars are mailed to those who contemplate chartering the parlor-buffet car for private parties. If a party numbering more than 25 has to be accommodated, a trailer is attached to the car, or the car is attached to a regular train if the service permits.



Attractive interior of converted parlor-buffet car of the Terre Haute, Indianapolis & Eastern Traction Company

Digitized by Google

Trends in Material Purchasing *Analyzed*

Survey shows that the inventory value of materials and supplies kept on hand by the electric railway industry totals approximately $72,500,000, representing 1.2 per cent of company valuation and 5.6 per cent of annual gross receipts. Total annual expenditures amount to $181,500,000. Railways buying small lots more frequently. Speed of delivery and standardization important factors.

THROUGH their purchasing and stores departments the electric railways of the United States and Canada carry on one of the largest merchandising and industrial operations in America. In the course of a year these departments spend millions of dollars in the markets for materials, supplies and equipment with which to maintain their properties and carry out needed improvements. They also accumulate and sell scrap materials to the value of many thousands of dollars, while the elimination of waste products and obsolete materials runs, in the course of a year, into high figures.

Through a survey made by the JOURNAL, covering 42 electric railways, representing 21,755 passenger cars and 10,118 miles of track, it has been determined that the average total stores inventory for the entire industry is approximately $72,500,000. This investigation further showed that there is a complete turnover of stores materials slightly over 2½ times per year, which indicates that the total amount spent in the course of twelve months is $181,500,000.

This figure checks closely with the data obtained from the electric railways for the record of expenditures, published in the January Statistical and Progress Number. For 1929, the industry expended $100,535,000 for maintenance materials alone. Most of these materials, of course, are handled by the stores department. To this amount must be added a large proportion of the $81,890,000 for way and structures, new plant and equipment, smaller proportions of the new plant accounts for cars, buses and power equipment, which had a combined total of $53,580,000, and a large proportion of the $20,720,000 for bus operating supplies. Assuming that these budget figures, submitted at the end of each year by the electric railways, are an indication of the amounts spent by the purchases and stores departments, the expenditures for materials have remained at a high figure for a number of years and have actually shown an increase in the past two years. According to estimates for the current year, another increase will be shown.

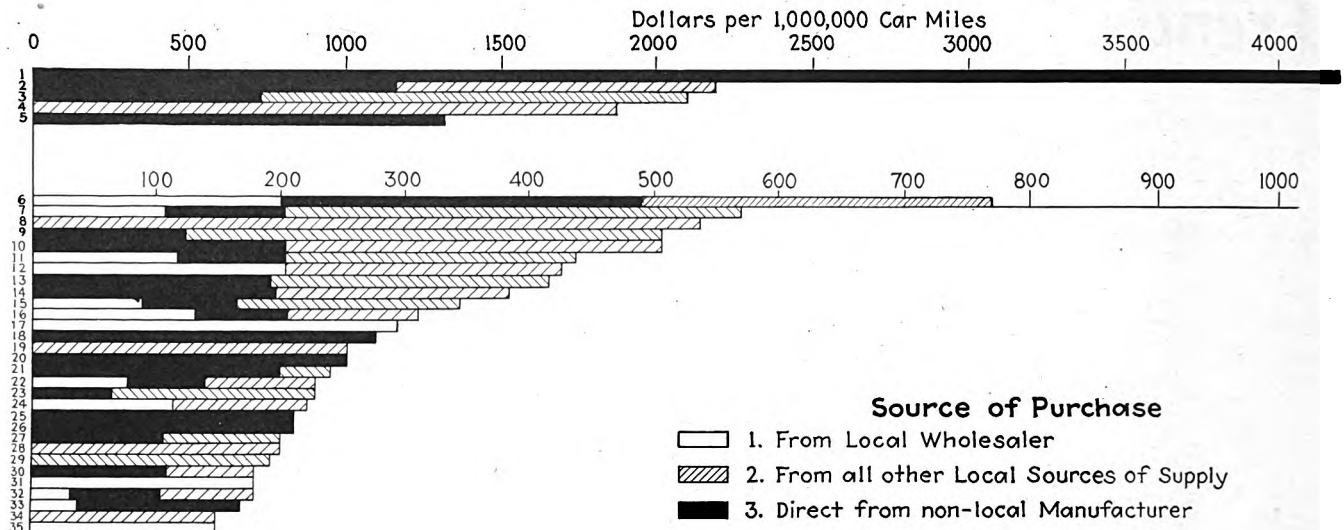
Other information secured in the survey indicates that the number of items kept in stock on a property of average size is over 8,000 and the inventory value is $460,000. This amount represents 1.2 per cent of the total railway valuation and 5.6 per cent of the annual gross receipts. It was also found that companies are buying small lots more frequently rather than occasional large lots; that compared with 1925 a majority of the companies are buying smaller quantities and buying more frequently; that wherever an increase in speed of delivery has been effected the railways have been able to reduce their inventory; that certain of the companies have been able to reduce their stocks by company or industry standardization, and that many companies use the A.E.R.E.A. standards.

Summarized Inventory Data of 42 Electric Railways

	Number of Passenger Cars	Miles of Track	Number of Buses	Items in Stock	Inventory Value, in Dollars	Ratio of Inventory Value to Total Company Valuation, in Per Cent	Ratio of Inventory Value to Annual Gross Receipts, in Per Cent
14 large railways: total	14,670	6,872	1,847	216,184	13,166,000	....	....
14 large railways: average	1,047	491	132	15,450	941,000	1.03	5.61
13 medium-sized railways: total	5,126	2,328	1,018	120,615	4,875,000	....	....
13 medium-sized railways: average	394	179	78	9,280	375,000	1.15	5.37
15 small railways: total	1,959	918	283	54,230	1,281,000	....	....
15 small railways: average	131	61	19	3,620	85,400	1.41	5.75
Total of 42 railways: total	21,755	10,118	3,148	341,029	19,322,000	....	....
Total of 42 railways: average	518	241	75	8,120	460,000	1.20	5.60

Digitized by Google

Annual Purchases of Large Electric Railway System



THIS chart represents the annual purchases of a large city electric railway company expressed in dollars per million car-miles.

Each class of purchase has been summarized separately and given a rank on the chart according to its importance. The prices of all materials used are net to the operating company, and do not include discounts, transportation charges, taxes or labor. Each bar is divided according to the percentage of the total amount purchased from the following sources: (1) from local wholesalers, (2) from all other local sources of supply, and (3) direct from non-local manufacturers.

1. Rail
2. Ties
3. Special trackwork
4. Car wheels
5. Brake shoes
6. Switches, electric
7. Cable, miscellaneous
8. Cable, lead covered, underground
9. Coils, armature
10. Wire, trolley
11. Bearings, ball, roller, plain, bronze, journal
12. Lamps, Mazda
13. Paving blocks
14. Castings, malleable iron
15. Plates, joint
16. Conduit steel for all types of wiring, underground and lead cable, etc.
17. Lubricants
18. Paint, oil and Japan
19. Oxygen
20. Lathes
21. Compressors, air, and parts
22. Insulators, porcelain, wood, glass, etc.
23. Heaters, car and building
24. Poles, trolley
25. Brushes, carbon
26. Ears, trolley
27. Castings, gray iron
28. Welding rod
29. Fence, iron and steel
30. Welding apparatus
31. Hose, rubber, all types
32. Bolts, machine
33. Axles, armature and car
34. Bonds, rail
35. Cement, Portland, asphalt and Lumnite
36. Bolts, track
37. Circuit breakers
38. Trolley wheels
39. Sleeves, pole and wire
40. Acetylene
41. Waste wool
42. Jacks and parts
43. Tampers, track
44. Solder, string, wiping, lineman's and wire
45. Castings, cast iron
46. Coils, field
47. Lockers
48. Varnishes
49. Brushes, paint
50. Lead, white
51. Castings, steel
52. Treads, safety
53. Tanks, steel
54. Wire, rubber covered with braid
55. Bushings, miscellaneous for cars
56. Tin, sheet
57. Rattan seating
58. Welding material
59. Soap, hand and car washing
60. Pumps, sump, oil, suction, circulation, etc.
61. Castings, truck
62. Splicers, wire
63. Registers, fare
64. Tape, miscellaneous types
65. Fire extinguishers
66. Wheels, emery
67. Castings, brass
68. Change carriers
69. Machines, tabulating
70. Locks, door, switch, cabinet padlocks, etc.
71. Wire, miscellaneous
72. Rods, tie
73. Bolts, special
74. Turpentine
75. Saws
76. Stokers
77. Pins, coupling, dowel, trunnion, channel, insulator, etc.
78. Holders, brush
79. Lock washers
80. Bolts, miscellaneous
81. Tape, friction
82. Valves, air, rubber, safety, check, etc.
83. Clocks, time recording
84. Drill bits
85. Wire, resistance
86. Batteries, dry and storage
87. Turnstiles
88. Asbestos, packing, sheet, cement, board, etc.
89. Gaskets, leather, rubber, asbestos, etc.
90. Line breakers
91. Hose, rubber, fire, pressure and air
92. Cable, rubber covered
93. Waste, cotton
94. Oakite
95. Wire, copper
96. Steel, tool
97. Tubes, boiler
98. Shovels
99. Cement, rubber, asbestos, etc.
100. Unions, pipe
101. Weed destroyers
102. Bells, buzzers, gong, parts and equipment
103. Rope, trolley
104. Mica, white sheet
105. Buckets, galvanized iron
106. Curtain material
107. Insulation tape
108. Varnish remover
109. Relays, electric
110. Hoists, chain, air and parts
111. Armature parts
112. Poles, line
113. Meters and parts, voltmeters, ammeters, Economy meters, etc.
114. Brooms, switch, paving, wire and rattan
115. Files, rail, wood, rasp, saw, cross, etc.
116. Connectors, cable and wire
117. Chamois
118. Paint, oil
119. Castings, bronze
120. Cloth, emery
121. Torches and parts
122. Cross arms
123. Cleaners, squeegees, brushes, scrapers and miscellaneous preparations
124. Catchers, trolley
125. Castings, miscellaneous
126. Cans, iron
127. Chains, sash, brake, jack, etc.
128. Lightning arresters
129. Handles, small tool
130. Brass, cold rolled, hand drawn and channel
131. Cocks, miscellaneous
132. Headlights
133. Plates, miscellaneous
134. Reflectors, headlight
135. Insulation, mica, porcelain, asbestos, etc.
136. Tubing, resistance
137. Tubing, steel
138. Enamel
139. Belting, leather and rubber
140. Bolts, fork, etc.
141. Paint, roof
142. Ladders
143. Hammers, hand and pneumatic parts
144. Straps, hand
145. Punches, shop
146. Duplicators, typewriting
147. Disinfectants
148. Door control devices
149. Plates, steel
150. Plates, tie
151. Tubing, brass
152. Wire, flameproof
153. Phosphor bronze-spring temper, wrought and filler
154. Wire banding
155. Wire magnet

Digitized by Google

For the purpose of analyzing the data secured, the 42 companies were divided into three groups, their representation in each group being determined by the number of passenger cars, number of buses and miles of track. Group one, consisting of the larger properties, includes fourteen electric railways with 14,670 passenger cars, 6,872 miles of track and 1,847 buses. Group two consists of thirteen medium-sized railways, with 5,126 passenger cars, 2,348 miles of track and 1,018 buses. The third group has fifteen companies, with 1,959 passenger cars, 918 miles of track and 283 buses. In analyzing the various factors investigated, reference will be made to these three groups.

The returns showed an extremely wide variation in the number of items kept in stock. In the large group this figure varied from 3,500 to 45,000; for the small group, it ranged between 1,200 and 6,500. So many factors govern the number of parts it is necessary to keep in stock, however, that considerable variation is to be expected. Standards of maintenance, whether or not the company generates its own power, whether or not it operates buses, and the degree to which materials are standardized, all have an important bearing on this figure. Naturally the larger companies require many more items than the smaller ones. For the former the number of items in stock averaged 15,450; for the medium-size railways it averaged 9,280, and for the smaller companies the average was 3,620. For all 42 railways, the average number of items was 8,120.

Analysis of the inventory values of the railway shows the same wide variations that exist for the items in stock. For the larger companies the inventory value ranged between $2,500,000 and $375,000; for the smaller ones it varied between $216,000 and $16,000. Average inventory values were $941,000 for group one, $375,000 for group two, and $85,400 for group three. For all 42 companies the average inventory value was $460,000.

Although the number of items in stock and inventory values showed wide variations, the percentages of total company valuation and annual gross receipts, represented by the inventory value, were more nearly constant within the groups. In group two, for example, the percentages of total company valuation ranged between .7 and 1.85. The average inventory figures by groups, in per cent of total company valuation were 1.03 for group one, 1.15 for group two, 1.41 for group three and 1.20 for the complete list. The larger percentages for the smaller groups is explained by the necessity for keeping a certain fixed number of parts for the maintenance of equipment, regardless of how many vehicles are in operation.

In relation to the annual gross receipts the inventory values for the larger companies averaged 5.61 per cent. For the medium-size companies, the per cent was 5.37, for the smaller ones 5.75, and for all 42 companies 5.60. Although there were a few wide variations from the average figures for each group, most of the companies were in the range of from 5 to 6 per cent.

Buying Small Lots More Frequently

Almost every company indicated that it was buying its supplies more frequently and in smaller amounts. This was particularly true for supplies for the maintenance of cars and even more so for buses. Materials for track construction and maintenance, on the other hand, are bought less frequently according to the reports. Several railways stated that they buy spikes, rail and other track supplies only once a year. Most of the railways which indicated that they were buying smaller amounts, qualified their statement by mentioning factors which influenced the buying of larger quantities occasionally. It is apparent that few railways are buying small amounts unless they can get the same price as would be tendered them for a quantity purchase. In those cases where discounts or other price inducements for large purchases are not offered for small quantities, most of the companies buy the larger amounts. Probably the generally accepted rule used is that small orders are placed unless the savings in cost obtained by a quantity purchase exceed the interest on the money tied up.

Another important factor with regard to ordering is the source of supply and the resulting time of delivery. Most companies specified that where the supplies were secured from local sources or nearby cities smaller amounts were secured. Products obtained from manufacturers at distant points are ordered in larger quantities. Of course, local and market conditions, as well as emergencies, have an important bearing on the amount and frequency of the buying. Only one company expressed itself in favor of large orders as a general principle. This company stated that it orders its supplies to last six months, to eliminate the added expense, mistakes and "red tape" of frequent ordering.

Compared with 1925 almost all of the companies are ordering smaller quantities and more frequently. Several of those who stated that there was no difference in their ordering of 1925 and 1929 added that they have been buying in as small quantities as possible for several years.

Speed of Delivery Reduces Inventory

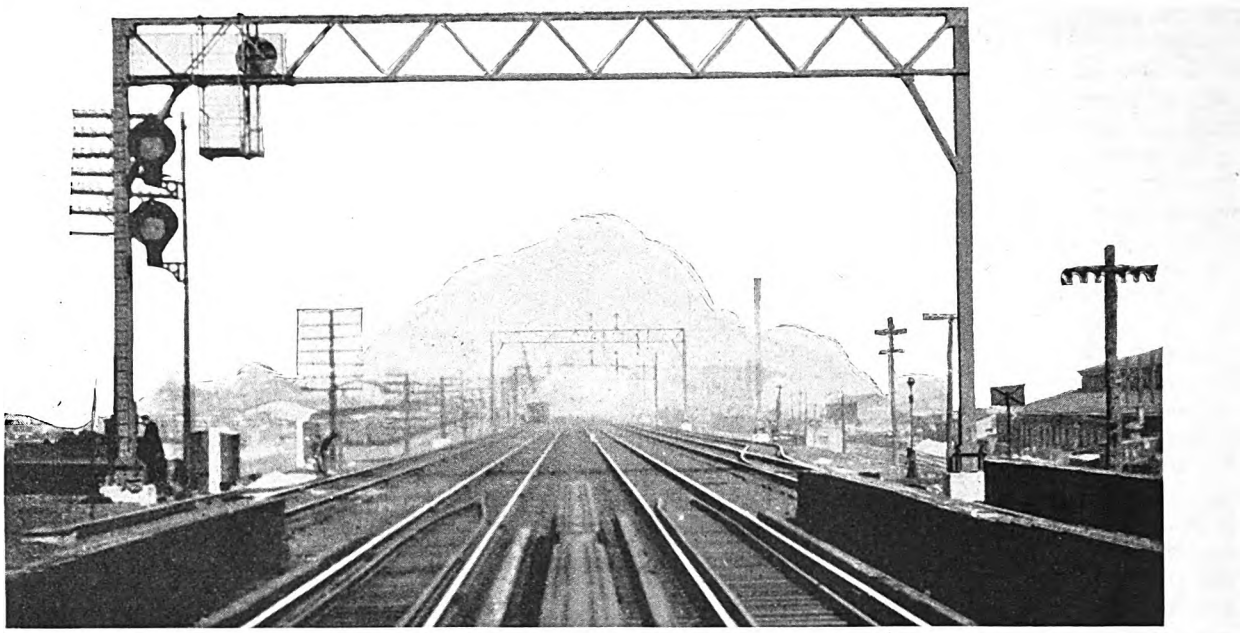
That the increased speed of delivery has been an important contributing factor in reducing the inventories of many railways was affirmed by the majority of answers received. Although one or two stated very emphatically that speed of delivery had assisted in reducing their inventories, the majority indicated that it was a contributing but not a major factor.

The greatest factor in reducing stock has been standardization by both company and industry. On those properties which have made real attempts to standardize their materials, very substantial reductions have been obtained. Some of the reductions reported were 50 per cent, 40 per cent, 20 per cent and 18.4 per cent. One company said that it had reduced its stock from $3,096,000 in 1924 to $2,040,000 at the end of 1929. Still another reported a decrease from $1,250,000 in 1926 to $750,000 in 1929. A few companies mentioned that it was impossible for them to reduce their stock because of the frequent changes in equipment.

Standards of the American Electric Railway Engineering Association are used wherever possible on a majority of the properties which replied. Three stated that they did not use these standards to any great extent and one mentioned that they were used only for scrap sorting, but all the others indicated that they were using them wherever possible or practicable.

Two companies indicated that they were using the A.E.R.E.A. standards almost 100 per cent. In the case of one company, they are used 10 per cent for maintenance of way, 80 per cent for electrical parts and 15 per cent for mechanical parts. In general, the majority of companies are adopting the standards wherever possible, and there is a decided move in favor of their general adoption.

Digitized by Google



One of the four-track catenary and signal bridges. The old banjo signals seen on the mast near the left of the bridge will be removed and replaced by color light signals of the type shown supported from the bridge

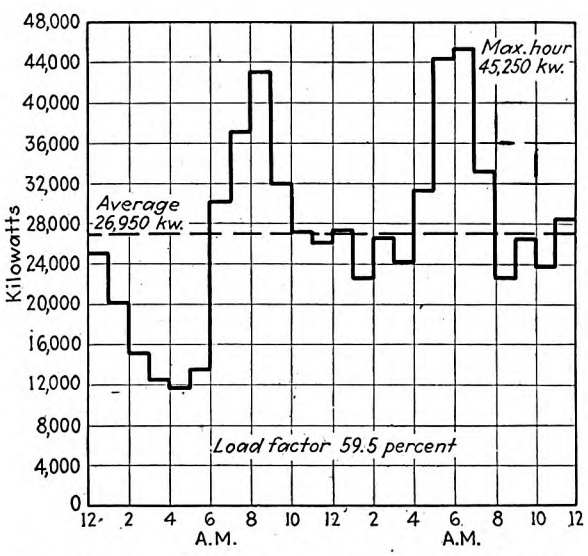
Reading Company's

Philadelphia Suburban

PROGRESS on the work of electrifying the lines of the Reading Railroad in the vicinity of Philadelphia is approximately up to schedule. It is expected to start operation a year from this spring or early summer. Ground was broken for the first of the catenary foundations June 18 of last year, and at present a force of 40 engineers and draftsmen is engaged in the design and about 650 men are on the outside construction, exclusive of work that is being contracted for.

The first stage in the electrification of the Reading was authorized by the board of directors on Oct. 25, 1928. Only preliminary work had been done prior to that date. Inasmuch as this is the first electrification work the company has done, it was necessary to develop all standards, plans, specifications, methods of procedure, etc., from the beginning, and to organize a force for this purpose. This of necessity has consumed some time.

The map shows the territory being electrified. The initial electrification extends from Reading Terminal to Lansdale on the Bethlehem branch, to Langhorne on the New York branch, to Hatboro, and to Chestnut Hill. It consists of 50 route-miles and 110 track-miles, and covers the most important of the suburban services. The suburban electrification may be extended to Norristown, Doylestown and Trenton, and when the through freight and passenger services are electrified, would be extended to Bethlehem, Bound Brook, and possibly Reading and Pottsville.



Typical power load curve after complete electrification of the Philadelphia district

A contract for power has been entered into with the Philadelphia Electric Company for 25-cycle, 13,200-volt alternating current to be supplied at Wayne Junction, 5 miles from Reading Terminal. This contract is for a term of twenty years, which allows the power company to amortize the investment in equipment installed for the railroad. Initially, the power is billed at established rates for railroad loads in this territory. When the railroad demand reaches a definite amount, the rates are based on the actual cost of

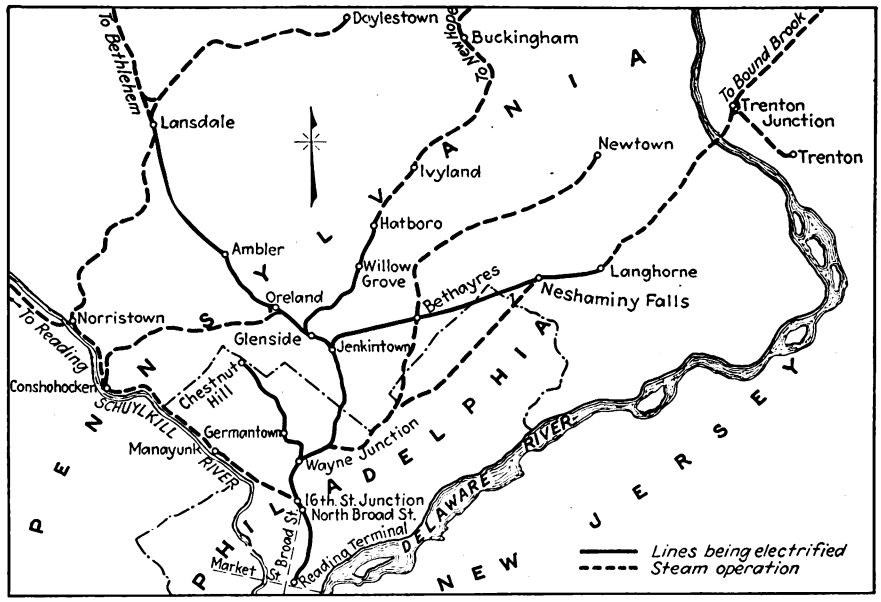
Digitized by Google

Electrification

Making Rapid Progress

Heavy suburban service will be given by 11,000-volt single-phase motor car trains on the initial section of the Reading's electric system. It is planned to extend the road later and to include main line freight and passenger service

By
G. I. WRIGHT
Engineer of Electric Traction, Reading Company
Philadelphia, Pa.



Electric service in the Philadelphia district will be given first on the suburban lines out of the Reading terminal. It will later be extended to cover the main-line trains

power to the power company, including both operating and fixed charges. This will result in a very reasonable cost of power and will enable the railroad to share in the economies which the power companies have made and surely will continue to make in generation, transmission and distribution.

A load curve for the future suburban, through freight and through passenger load in the general Philadelphia area is reproduced. This shows a maximum hour demand of 45,250 kw. and a load factor of 59.5 per cent.

The importance of a favorable power rate, and one that is made more favorable by increasing loads as well as increasing load factor, is apparent when it is seen that the Reading Company's power bill, after through electrification for the Philadelphia territory, will be around $1,500,000 per year.

To furnish this power the Philadelphia Electric Company will run underground, 13,200-volt, 60-cycle lines from Westmoreland substation to Wayne Junction, and at the latter point erect a frequency changer station. Two 15,000-kw. motor-generator sets will be installed initially, while the station will have an ultimate capacity of six such sets. Power will be delivered to the railroad substation bus at its Wayne Junction substation.

The three-wire system, with 36,000-volt transmission will be used in the suburban zone. This system with a lower transmission voltage is used on the New Haven, and in a modified form on the Virginian electrification. It has also been successfully used in Sweden.

The substations consist of auto-transformers connected between the 36-kv. transmission wires and the trolley wire with the one-third point connected to the rails.

Due to the number of stub lines with consequent frequent substations and the narrow restricted rights-of-way this system is particularly economical in first cost. It is also advantageous from the standpoint of minimizing inductive interference in communication lines.

For extensions to Bethlehem, New York, etc., 66,000-volt, single-phase transmission lines will be used. Due to the Central Railroad of New Jersey's having a very heavy suburban service, a source of power for the New York end is considered a necessity.

The zone initally being electrified has an exceptional number of interlockings and junction points. There are nine interlocking plants in the first 10 miles of railroad between Reading Terminal and Jenkintown. All contact wires are sectionalized at these points and this results in complicated catenary wiring and the necessity for a large number of trolley circuit breakers.

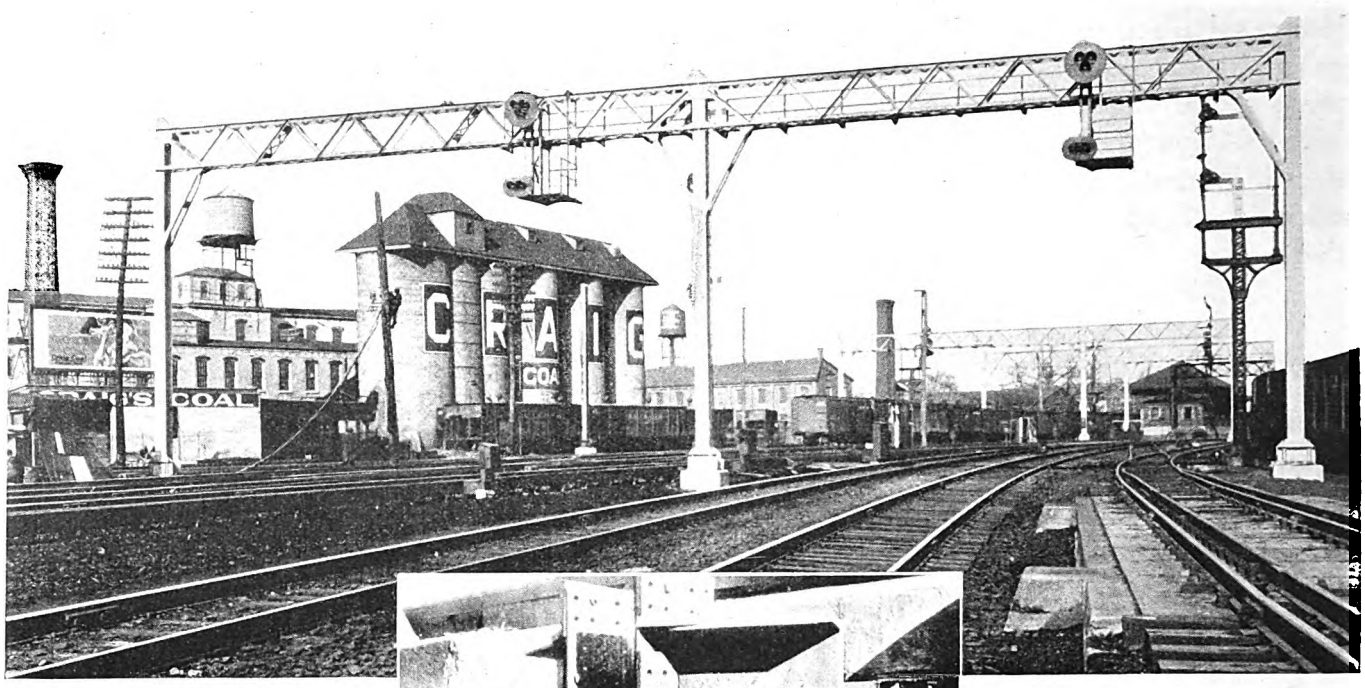
In the event of trouble or faults in the catenary system, these being much more frequent than in a power company's distribution system, selective action of the circuit breakers is necessary. Several new schemes of obtaining selectivity have been studied and actually tested out, with small proportional currents in a network set up to duplicate the railroad's distribution system.

Supervisory control will be used to operate all circuit breakers and sectionalizing disconnects between substations.

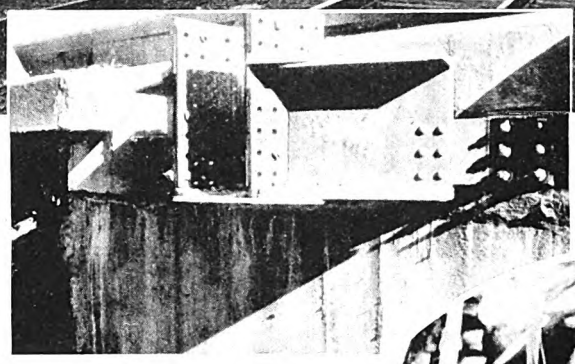
Two Types of Catenary Structures

The catenary and transmission structures are of two general types. A fabricated truss supported by H columns is used in the four- and five-track territory be-

Digitized by Google



Catenary bridge with central supporting member, showing also the new signal installation



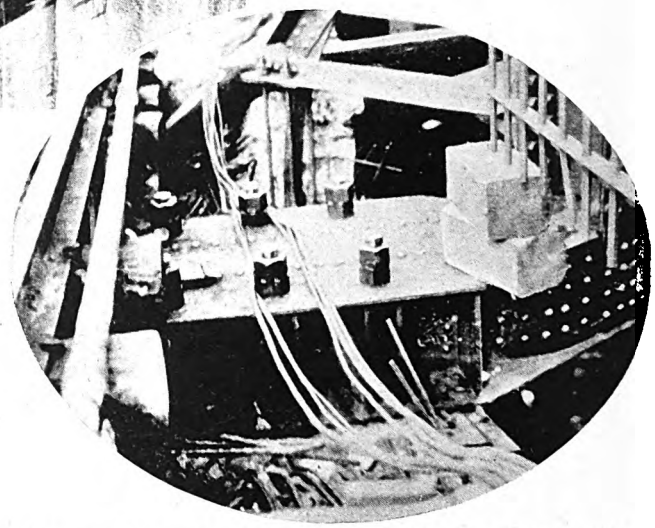
The space for installing supporting bridges is so restricted that in some places they had to be placed on the outside of the retaining wall

tween Reading Terminal and Wayne Junction. Here the restricted right-of-way and proximity of buildings along either side of the railroad makes necessary carrying the transmission wires on masts mounted on the truss. Due to the frequent interlockings, there are many signal bridges in this territory and the catenary bridges are designed to accommodate the new signals which are hung from the trusses. These bridges are fitted with ladders, walkways and cages for signal maintenance, all the old signal bridges are being removed.

North of Wayne Junction the H columns are run up to carry the transmission wires and H section crossbeams instead of trusses are used. Copper-bearing steel is used for all the lighter steel members as an additional protection against corrosion. No transverse guys are used but longitudinal guys for dead ends and at wire crossings. Considerable pains have been taken in the structure and catenary design to standardize as much as possible, keeping the number of types of structures, fittings, etc., to a minimum.

Foundations are all designed with anchor bolts and both gravity and side-bearing designs are used. An unusually large number of special foundations were necessary on account of interferences and restricted right-of-way. Some of these are shown in accompanying illustrations.

Two different types of inclined catenary are being installed. The first is the conventional type in which a bronze trolley wire is supported from an auxiliary copper messenger, which in turn is supported by a bronze main messenger, using three wires in all, and 300-ft. spans. This is being used between Reading Terminal and Langhorne. The second type has only two wires, a bronze trolley wire being supported from a composite



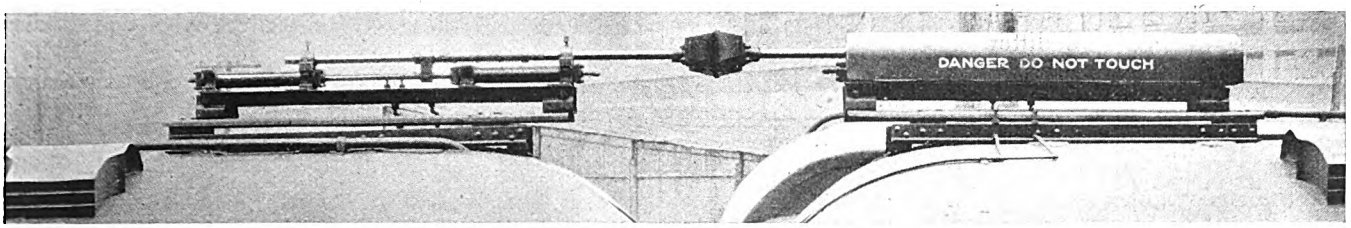
Another unusual location for a catenary bridge foundation. The proximity to the running rail at the left shows the limited space available for the construction

copper and bronze messenger cable with 250-ft. spans. It is to be installed between Jenkintown and Lansdale, and on the Hatboro and Chestnut Hill branches. This type is simpler, lighter and less expensive and the structures can be somewhat less expensive also. We will thus have a comparison of these two types to use in making decisions for further electrification work. It is felt, however, that the latter type of catenary will give entirely satisfactory results, particularly with the method by which we plan to collect the current.

New 11,000 Train Bus Line Connectors Developed

Two pantographs will be in contact with the wire at all times and connected together electrically on the car or locomotive. At least one of these pantographs will be sure always to be in contact with the wires, and as they are in parallel this should minimize if not eliminate sparking.

Digitized by Google



Connectors between cars couple the 11,000-volt train bus lines automatically. This device was designed and developed by the Reading engineers. The cover at the left is removed to show the construction

With this method, on a ten-car multiple-unit train only two pantographs would be in operation, instead of all ten as in the ordinary scheme where every motor car is independent of all others. This should result in materially less trolley wire and pantograph shoe wear, also less damage to wires and pantographs in the event of a pantograph fouling the wire system, a not infrequent occurrence.

However, the use of such a system for our trains necessitates an 11,000-volt bus line run along the tops of the cars and a means of connection between the cars which is automatic in its operation. Such a connector was not available and the manufacturing companies were requested to develop one. The designs proposed were not considered adequate or satisfactory, so we undertook to design such a device. This has been done and a bus line connector has been built and operated successfully on two steam cars for the last three months. This connector, shown in one of the illustrations, will be used on the new cars.

While this method of operation has not been used in this country, the use of two pantographs bussed together on locomotives is common practice in Europe and results obtained were carefully checked with operating and maintenance people abroad.

Lightweight Cars Will Be Used

While there will be nothing radical about the new cars, they will incorporate many refinements and improvements and will show considerable weight reduction over most existing cars of their size. All will be motor cars and will seat 86 passengers, and each will be equipped with two single-phase commutating motors of 250 hp.

There has been great activity in the alternating-current single-phase traction motor field within the last few years. We now have six single-phase motor-car motors to choose from, where a few years ago there were only one or two. It is expected that the latest types will show superior performance and maintenance. Even greater activity in locomotive motor design has taken place and is taking place in anticipation of the Pennsylvania requirements, and the Reading will fortunately be able to profit by this when it buys locomotives.

There has fortunately been time to give considerable thought to the layout and equipment on the cars. This has resulted in reducing the amount of conduit, wire, and air piping to what seems to be an irreducible minimum. The layout has been made such as to be most accessible for inspection and maintenance. Improvements have also been made in the ventilating apparatus and ducts, and a new system, designed by the railroad, of filtering snow and dirt from the ventilating air is to be used.

Motors have been so arranged that they can be removed from the trucks without removing the truck from under the car and the car body can be lifted from the trucks without disconnecting ventilating connections. A new design of truck has been tested out for several months on one of our steam cars in regular service and may be used on the new cars.

The high cost of heating electric trains is not generally

Pouring concrete for a signal bridge foundation under difficulties. By the use of a concrete train no space for installing mixing machinery was needed

Digitized by Google

realized. The energy for this purpose during the heating season amounts on different roads to from 20 per cent to as much as 40 per cent of the total energy used. To reduce this to a minimum, consistent with comfort to the passengers, a double thermostat control will be used, a 70-deg. thermostat being used only during the time the engineman is in the cab and a 50-deg. thermostat at all other times. Also provision is made whereby the engineman can change from the high to the low thermostat for all cars in the train when approaching a terminal to economize on the heat.

A new automatic door-closing device will be used which automatically closes all end doors in the train as soon as the train starts after the station stop. This, in addition to having heat, will avoid drafts due to doors being left open until they are closed by the trainmen.

Shop Facilities at Wayne Junction

To handle the inspection and repair of the cars and future locomotives, and to store them during the day when not in use, a new car shop and storage yard is nearing completion at Wayne Junction. The shop has five tracks, three for inspection, two for repairs. It is 320 ft. long and can be extended to twice its present length for future requirements. This shop is being pushed to completion for use as a construction storehouse and headquarters for the overhead construction, as it is strategically located for this purpose.

Adjacent to the shop will be the frequency changer substation, the Wayne Junction transformer substation, linemen's maintenance headquarters, and the load dispatchers' office, which will make this location the electrification headquarters. This should make a compact and efficient operating arrangement.

Lastly, the large amount of work in preparing the railroad for electrification should be touched on. Additional clearance has to be provided where required for the overhead wires; grade crossings are to be eliminated; direct current signaling has to be changed over to alternating current; underground conduit has to be installed; telephone wires have to be put in cable and in some localities underground; foreign wire crossings rearranged and eliminated; new storage yards built, and many other changes made. Cost of this work in our case will be approximately equal to that of the electrification proper, including the new cars. Later will come training of the present personnel to operate and maintain the equipment.

All engineering work for the electrification is being done by the Reading Company; also all construction work, except buildings, is being done by railroad construction forces organized for this purpose.

Care Essential in Stringing Trolley Wire

Expansion and contraction with temperature must be taken into account if lines are to be kept tight and breaks prevented

By **J. F. NEILD**
Electrical Engineer, Toronto Transportation Commission

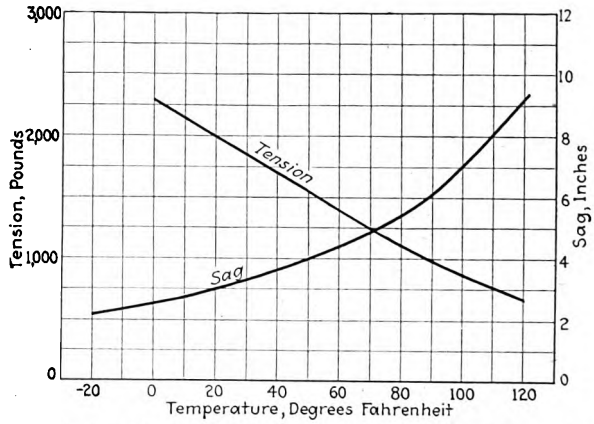
IN THESE days of rapid street car service operated on close headways, the trolley wire demands serious consideration, first as to kind and second as to method of erection. The kind of wire depends on such physical conditions as grades, curves, etc., and on such operating conditions as the amount of energy required for the starting and acceleration of the rolling stock, the frequency of stops, etc. The materials available for practical purposes range from hard-drawn copper trolley wire, which is suitable for long tangent routes having infrequent service, to high-strength low-conductivity bronze trolley wire backed up by heavy feeder capacity for close headway trains, curves, loops, etc.

This part of the subject has been fairly well covered in technical journals and manufacturers' advertising matter and information is easily obtained.

The erection of the wire is just as important as the use of the proper kind of wire. The greatest care must be exercised to avoid any nicks, cuts or scratches, as these materially affect the life of the wire.

The trolley wire should be as nearly parallel to the track as it is physically possible to make it, depending on a not too rigid cross-span for flexibility. It is in trying to erect the overhead structure in such a manner as to obtain this condition that one meets problems.

For instance, 1 mile of unstressed copper trolley wire will contract in length approximately 4½ ft. for a decrease in temperature of 100 deg. F. Consequently, if the trolley wire is strung too tightly at high summer



Tensions and sags for stringing 00 hard-drawn copper trolley wire at various temperatures, 100-ft. span

temperatures it will probably snap at the slightest provocation under sub-zero conditions. At the same time, to obtain the maximum life from the trolley wire, it is advisable to keep the sag as small as possible.

In Toronto, which has a climate similar to that of other Northern cities, temperature variations have been recorded during the period of electric railway operation from 20 deg. F. below zero to 104 deg. F. above zero. Trolley wire must be strung so that it will not fail at the extremes of this range. The tension and sag curves at various temperatures in the accompanying illustration have been computed for our own conditions; that is, so

Digitized by Google

Measuring the trolley wire tension with a dynamometer

that the maximum stress at 20 deg. F. below zero with a loading of ½ in. of ice and 8 lb. per sq.in. wind pressure, will not exceed half the ultimate strength of the wire. The fact that all of these maximum conditions are not apt to occur at the same time simply adds another factor of safety to the calculation.

On any other property it would appear that to obtain the maximum wear from the trolley wire it would be advisable to derive the relation between temperatures and tensions to conform exactly with normal expected weather conditions. Bronze trolley wire, of course, may be strung at greater tensions than the hard-drawn copper wire on account of its higher ultimate strength.

A dynamometer inserted between the trolley wire clamp and the blocks in pulling up the trolley wire gives a direct measurement of the tension. The measurement of sag, when made accurately with a level and corrected for exact length of span, is a good check on tension of trolley wire already in place. It is not accurate enough to measure the sag from the rail, as an almost imperceptible grade in the track is enough to throw the results out considerably.

At the present time the problem of the correct tension of trolley wire and span wire for varying conditions is being taken up in study by a special committee of the Power Division of the American Electric Railway Engineering Association with the idea of establishing a set of tables and curves that will cover more generally the different variable factors.

In Toronto, during the past few years, we have replaced as much trolley wire as possible in the cold weather while the wire is near its maximum contraction. As a result the wire is rarely called upon to exceed its original stringing tension.

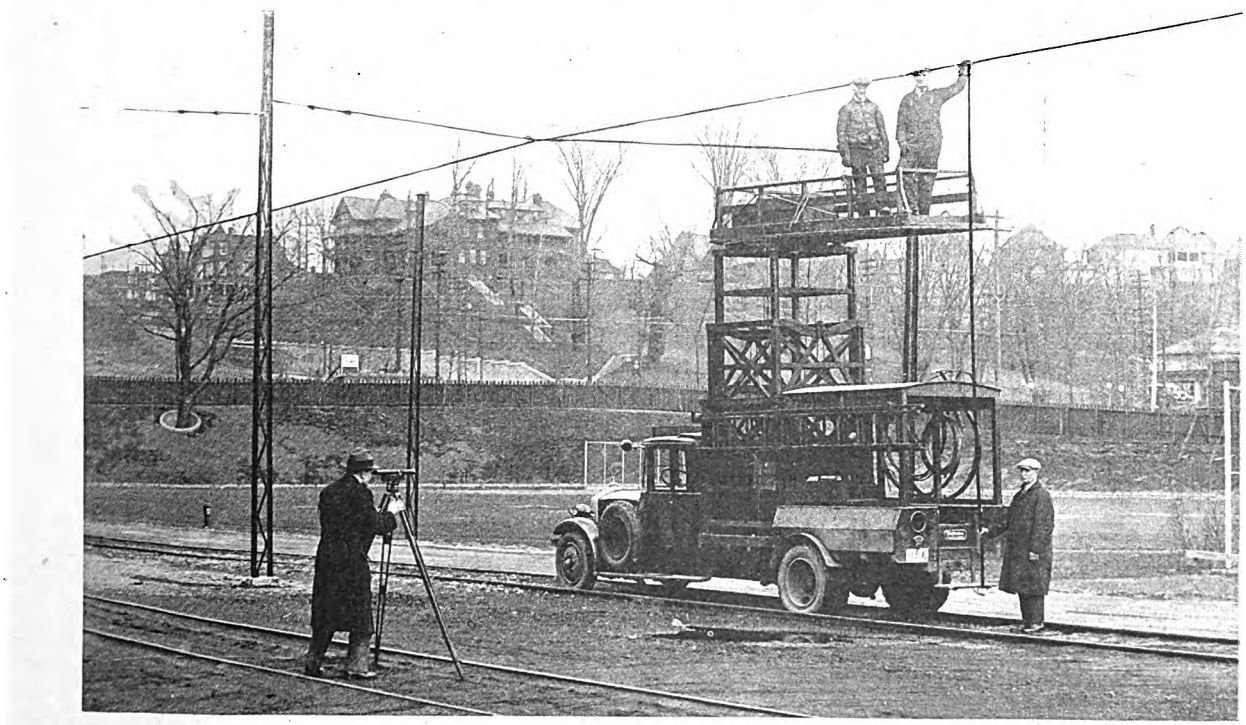
I have not given any data as to the broken trolley wires per year on this system. Information on this subject appeared in the issue of Electric Railway Journal for January, 1930, page 48. The results indicate that, even under the severe conditions encountered in Toronto, little difficulty has been experienced with trolley wire breaks.

Thawing Frozen Water and Conduit Pipes

By H. A. Brown

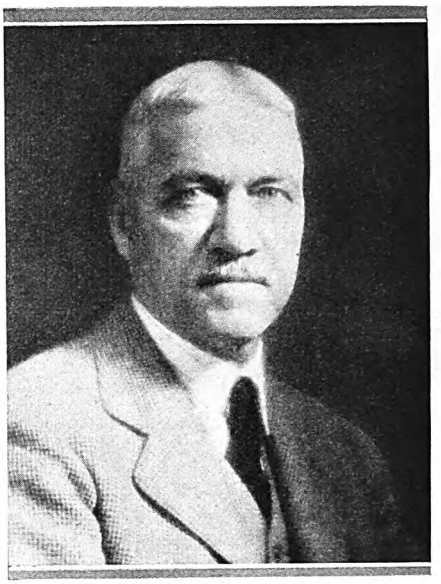
Foreman Return Circuit, Switch and Signal Division
Cleveland Railway

Frequently during the winter months. it is necessary to thaw out frozen water or conduit pipes. To do this work quickly and efficiently the Cleveland Railway often uses the regular rail joint bonding equipment. This unit consists of a 600-volt rotary converter and a transformer which provides 1,500 amp. at 12 volts potential across the two secondary leads, each of which is about 20 ft. long. The leads are connected to the ends of the frozen section of pipe or conduit and the current applied for about one minute. This is usually sufficient to thaw out the frozen pipe. The use of the bonding device for this purpose has saved a great amount of time and sometimes has saved a complete pipe renewal.



Checking up on tension of the trolley wire by measurement of the sag with a level

Digitized by Google



Preferential

Traffic Rights

for Street Cars

Mass transportation must be expedited. Many plans for relief of congestion are merely palliatives. Parking should be radically restricted or abolished on important thoroughfares. Dominant consideration must be given to the major movement

By

WINTHROP M. DANIELS

Professor of Transportation
Yale University

RAPID multiplication of motor vehicles has profoundly influenced both the street railways and the steam railroads. This new agency of transportation has made itself felt both in the competition it has offered in the field of passenger traffic and in the way it has affected the business of operation.

It is a commonplace to say that the private automobile has cut heavily into the passenger traffic of both the steam railroad and the street railway, and that the motor truck—in a lesser degree—has taken over some part of the short distance merchandise traffic of the steam railroads. The decline in the passenger revenue of the steam roads since 1923 has been not far from 10 per cent, and the reduction in passenger-miles about the same, the commutation traffic showing, however, an increase of about 10 per cent, with the shrinkage coming in regular passenger service where the average journey has increased from 54.6 miles in 1922 to 73.2 miles in 1928.

The decline in street railway and associated bus traffic is computed by the ELECTRIC RAILWAY JOURNAL to have been from 116 to 101 revenue rides per capita from 1902 through 1929, but riding patronage for the past few years has been about constant. This is the more encouraging from the fact that the registration of automobiles has in the same period been constantly rising. The gross passenger receipts of the street railways, unlike those of steam railroads for passenger service, have for the past four or five years shown a decided increase, those for 1929 being the greatest in their history. This is largely due to the increase in the individual fare which on the average has risen from the old nickel fare to about 8 cents.

From these rather bald facts several inferences may be drawn as to the influence of private motor car competition upon the two related industries. The menace to the street railways was immeasurably the greater. Passenger traffic is overwhelmingly their main source of revenue, whereas with the steam roads it contributes only one-fifth as much revenue as freight. In numerous cases the steam roads, by substituting gas-electric or motor-bus operation for regular passenger service over lines of sparse traffic, have actually saved by the lower cost of operation, whereas the diversion of trolley traffic to the private automobile is practically a dead loss to the street railway.

Nor do the street railways have much collateral compensation for this loss of traffic, whereas the steam railroads from the transportation of automobiles, auto trucks, auto parts and tires alone derived almost 5 per cent of their carload freight revenue in 1928. Petroleum oils, refined and other gasolines yielded more than as much again, and if road-building material be added, it can be seen that the steam railroads have had a handsome offset in increased freight tonnage and revenue to the not incon-

Digitized by Google

siderable shrinkage in their gross passenger revenue.

It ought, of course, to be added that the steam railroads have lost some of their short distance freight traffic to the motor trucks. But there are two considerations that diminish the importance of this factor. The first is the railroads' own adoption of the motor truck where it can be run to advantage, particularly in cutting down the daily number of way freight trains formerly operated. The second is that short-distance, less-than-carload merchandise traffic is commonly understood to yield very thin net revenue. So that the abatement to be made in the railroads' gain of tonnage and revenue, directly and indirectly traceable to the motor vehicle, is not of overwhelming significance.

The multiplication of the private automobile has relegated both the steam railroad coach and the street railway car to a wholly secondary place, if measured in the relative number of passenger-miles covered collectively by each type of vehicle annually. It has drawn from the rails much traffic that will never be regained. It has, however, created a much vaster amount of traffic than it ever attracted away from the railroads or the railways. But it has been demonstrated that there is a core of passenger traffic the automobile is powerless to absorb. It can never absorb long-distance high-speed passenger traffic. It can never absorb commutation traffic nor the mass movement of city traffic in commission hours.

There is still a no man's land where the competitive rivalry is acute — where it remains to be seen whether the railroads and street railways, both supplemented by their own automotive adjuncts of trucks and buses, can coax back to themselves and away from the private automobile and the private truck, the marginal traffic which for the moment can be handled by either.

In the matter of operation, the millions of private motor cars and trucks have created problems of an entirely different character for the steam roads and the electric railways. The former operate, of course, upon their own right-of-way, whereas the electric railway and the thousands of buses operated as extensions use the city streets and the public highways. Upon an exclusive right-of-way, the physical obstacles from motor vehicle operation are at a minimum. To this almost the only exception is at grade crossings where the many fatalities create a serious situation, and intensify the demand for more complete crossing protection or even the still more expensive separation of grades. But apart from this situation, it may fairly be said that the problem of physical operation of steam railroads has not been seriously complicated by motor vehicle operation.

Indeed, in some respects motor truck operation has been of direct advantage to the steam roads, particularly in their interchange of merchandise freight in large terminals. Of course, so far as railroads use the motor truck or motor bus as adjuncts, these vehicles encounter the same operating difficulties on the streets as confront the motor vehicle generally; and this field is one which in large centers is growing rapidly. The Pennsylvania Railroad only recently filed a schedule according free passenger transfer by bus to parties of 25 to points within Manhattan, the Bronx, Brooklyn and Newark where their tickets apply to or from designated territories upon that carrier's lines. But apart from this railroad use of buses and trucks, and from crossings at grade, the multiplication of motor traffic has not created serious operating problems for steam railroads.

While the motor vehicle disturbed in only a minor degree the physical operation of the steam railroad, it may be said to have almost disrupted the operation of street railways. The arteries of local street traffic in central shopping and business centers are suffering from high blood pressure; they are ordinarily congested, and not infrequently are wholly clogged. The ability of surface car lines to maintain the headways requisite for mass transportation morning and night has been threatened or impaired. The prospective dispersion of the car-riding public has also created bewilderment as to the permanency of routes to be operated. The dilemma has grown until it involves not the operation of the surface lines alone but the far wider problem of city planning in general.

The root of the difficulty lies, of course, in the fact that the area of our paved thoroughfares was a century ago designed to accommodate the horse-drawn traffic of that time. We are now engaged in the almost hopeless effort of trying to force a 3-in. stream through a ½-in. nozzle. And as if the job were not difficult enough, we have accentuated it by diminishing the already inadequate roadways by the practice of parking. The difficulty is intensified by the rapidly increasing number of motor vehicles. Plant an overplus of seeds in a garden patch and they will choke and kill each other just as surely as would so many weeds.

There have been devised numerous remedies which in different places operate with a differing degree of success. But they all suffer from one of two defects—either they are mere palliatives, or else they involve such vast expense that they can seldom be practically used. Among the palliatives—helpful in themselves, but incapable of affecting a radical cure—are: (1) abolishing the left hand turn; (2) restricting the narrower streets to one-way traffic; (3) staggering opening and closing hours of business houses and theaters; (4) confining heavy trucking of coal or garbage and refuse to night or early morning hours; (5) improving the operation of traffic light signals so as to speed and not to obstruct traffic; (6)

Editor's Note

PROBLEMS of transportation have long been familiar to Professor Daniels. For many years he was professor of political economy at Princeton University. From 1911 to 1914 he was a member of the Board of Public Utility Commissioners of New Jersey, and from 1914 to 1923 a member of the Interstate Commerce Commission, serving as its chairman for two years. Since 1923 he has been professor of transportation at Yale. The accompanying discussion of present-day problems of urban transportation is based on a talk made by Professor Daniels at a recent meeting of the New England Street Railway Club.

Digitized by Google

providing by-pass streets for traffic which has no need to occupy main thoroughfares; (7) the skip-stop plan for the trolley cars; (8) the boulevard-stop plan; (9) uniform traffic codes such as prescribing whether turns on the red light may be made without stopping, or only after stopping, or not at all; (10) requiring loading and unloading platforms for stores to be constructed within building lines and not projecting upon the sidewalk; (11) provision by the city, by private garages or by business houses (for their customers) of parking spaces off the streets; (12) limited parking (generally ineffectual and unenforcible); (13) prohibition of parking, or at least its restriction to non-congested areas. This baker's dozen of remedies, however, are merely palliatives. "Anti-Fat" is no remedy for the dropsy.

Then there come the more ambitious remedies such as street widening, double-decked streets, arcaded sidewalks, city-zoning with a limitation on the height of buildings abutting on the streets, over-passes at the junctions of crowded motor traffic lanes, underground escalators for pedestrians, and finally subways costing millions of dollars a mile. It is tolerably safe to say that except in the largest and densest urban centers these remedies will involve prohibitive expense.

Where, amid this jumble of ill-assorted plans, does the future operation of street railways come in, and along what lines does their hopeful future lie? As one wholly inexpert in street railway operation I would venture the following suggestions: First, they must put in a claim, not only in their own interest, but equally in the interest of the car-riding public, that in congested urban sections during commission hours they must be given a preferential use of streets and public thoroughfares. When it is remembered that a car with 60 passengers takes perhaps one-twentieth of the street area necessary for the accommodation of 20 or 25 private automobiles with the same number of riders, a strong argument can be made for such preferential right-of-way as may be necessary to expedite the mass movement of the riding public for definite periods both morning and night. Parking on such thoroughfares should be radically restricted or abolished. "The essence of the public easement in the highways is passage. Parking is the antithesis of passage," says one of our legal lights; and "Storage on the highways is trespass" on the abutting owner, and a common nuisance to the public. The inconvenience of the few ought to give way to the convenience of the many, and dominant consideration should be shown to the major movement.

This result will not be attained until a campaign of education has taught the merchant that parking before his door is not only an injustice to the public, but is dispersing his own customers to more accessible local sub-centers, and is opposed to his own long-run interests. Once the merchant is convinced, the road-hog and the curb-hog can be taken into camp.

It is also to be noticed that the very inertia which opposes any thorough remedy for street congestion is, in a way, self-corrective. The growth of sub-centers for independent shops and branch stores and even for banks, and the rapid migration of business away from the narrower streets to the wider avenues and thoroughfares should warn the standpatters that they are standing in their own light.

There can be little question that the present tendency is to contract rail mileage and to expand bus-route mileage. Figures can be given to show that bus-route mileage is already 50 per cent of street railway track mileage, and the passenger mileage by bus is a growing percentage of total passenger-miles. Absolutely and relatively, track mileage is on the decline. Last year witnessed a net shrinkage of track amounting to more than 1,000 miles. It has yet to be shown that the bus can ever wholly supersede the car on rails in city transportation.

One final suggestion is ventured. Is it too much to expect that the vehicle designer will contribute to the preservation and even the popularization of the riding habit, both by car and by bus? In some ways, the typical street car is an efficient instrument, but in the same way that a military tank or an armored car is an efficient instrument. It has about the same life as a railroad box car. It can and does stand up under heavy usage. Both the car and the efficient braking apparatus make notably for safe operation. Much of the older equipment, however, is unattractive. Access by steep steps, through narrow platform entrances, limited ventilation, and often a single difficult exit are not calculated to allure traffic. The street railway buses seem to have improved upon the car in these respects, and more particularly in the seats. The bus, however, has a life of only five to six years, and its upkeep and retirement costs must be high. It lacks the staunchness which is the street car's basic merit. But the lure of line, style and color, convenience and design cannot be permanently neglected if the electric street car is to maintain the popularity its utility deserves.

"Bus Transportation" Offers Awards

IN AN effort to stimulate further improvement in motor bus operating methods and practices among the motor carriers in the United States and Canada, *Bus Transportation* has set up six awards for the most outstanding examples of progress made in maintenance practices and methods.

The six awards are divided among three different classes of companies:

(a) Those companies operating 3,500,000 or more bus-miles annually in revenue service; (b) Those companies operating 1,000,000 and less than 3,500,000 bus-miles; (c) Those companies operating less than 1,000,000 bus-miles annually in revenue service.

For the most outstanding example of progress made in maintenance practices and methods to date by any carrier in each of the three classes mentioned, a medal plaque and a certificate of award to the carrier, and in addition $500 in cash to be employed in any manner it elects. For the second most outstanding system of maintenance practices and methods, honorable mention will be given in the shape of a certificate of award, and a medal plaque. All awards will be based on (1) the record of results achieved, and (2) the explanation of the maintenance practices and methods employed.

The committee of awards consists of the following: Arthur M. Hill, president National Association of Motor Bus Operators, chairman; E. P. Warner, president Society of Automotive Engineers; Charles Gordon, managing director, American Electric Railway Association; Carl W. Stocks, editor *Bus Transportation;* P. J. Neff, chairman Motor Coach Section, Motor Transport Division, American Railway Association.

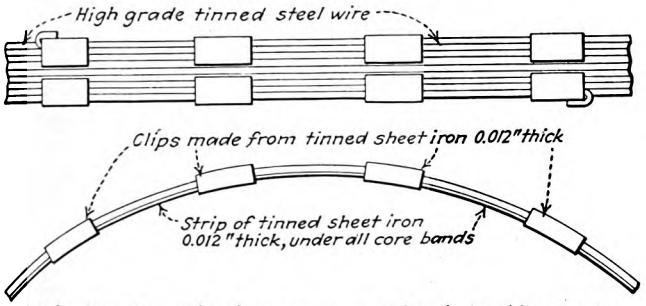
The awards will be announced at the annual convention of the National Association of Motor Bus Operators, to be held in Chicago, Sept. 18 and 19, 1930.

Digitized by Google

Anchoring Armature Core Bands

By J. S. Dean
Westinghouse Electric & Manufacturing Company

By anchoring the ends of core bands on railway armatures, which are subject to severe mechanical strain due to centrifugal force when the armature is rotating at high speed, the service life of these bands can be materially lengthened. The bands should be wound in place on the core, using a high-grade tinned-steel wire having an ultimate tensile strength of 200,000 lb. per square inch. Preferably a 14 B&S gage wire should be used and wound at a tension ranging from 200 to 250 lb. Under the core bands a strip of 0.012-in. tinned sheet steel extending the entire way around the armature should be installed. If these methods are followed it is not necessary to use tinned strips on the end bands over the extension of the coils, at both the front and the rear ends of the windings.



Anchoring the ends of armature core bands in this manner gives longer life under service operating conditions

Clips of 0.012-in. tinned sheet steel should be equally spaced (about every third or fourth slot) around the armature. These should be placed under the steel strip over the coils and not on top of the teeth.

At the start and finish of the band wire four of these clips should be placed about 1 to 1½ in. apart, to hold the ends securely. The ends of the wire should be anchored by bending them at the start and finish around the tinned clips for about ¼ in., as shown in the sketch.

While ordinary half-and-half solder is widely used for this class of work, pure tin is much stronger and has a much higher melting point than the half-and-half solder. A high-melting-point solder has recently been developed by one manufacturer which is used to solder the bands on all of his railway motor armatures. Reference to the table shows the relatively high melting point of this new alloy.

Materials	Melting Point Degrees Centigrade
Half-and-half solder	188
Pure tin	232
High-melting-point solder	300

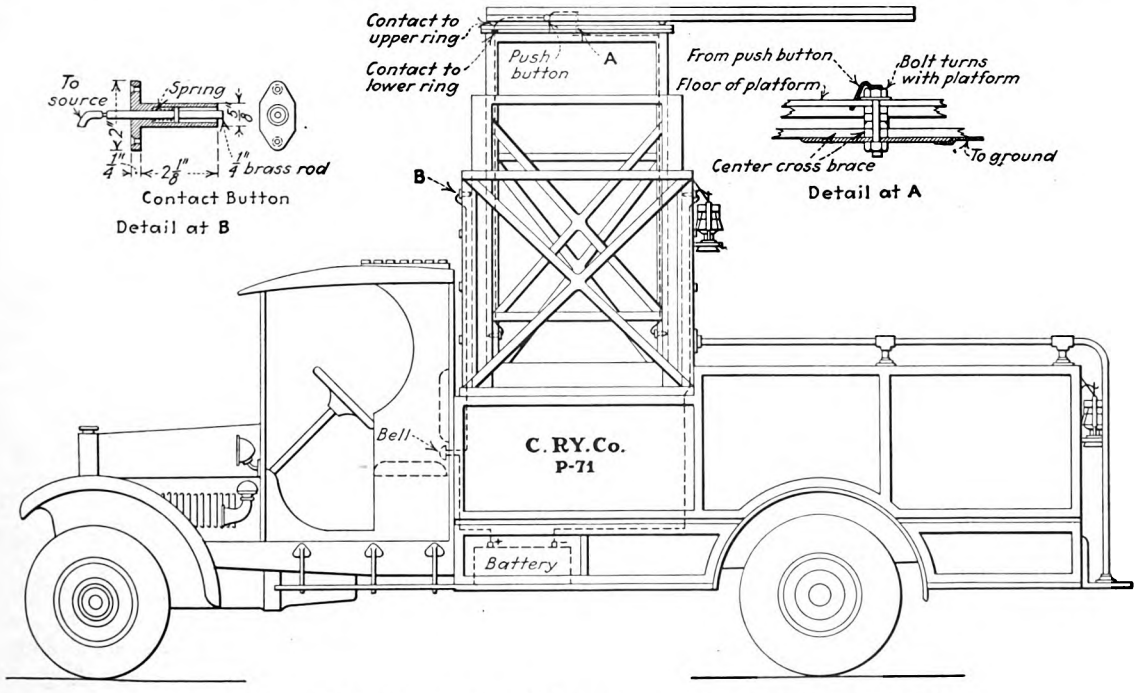
In connection with the use of this special alloy solder, the repairman will find it a big help to use a very hot soldering copper weighing about 5 or 6 lbs. This has been found essential to do a good soldering job on the bands.

Signal Bell on Tower Truck*

By H. A. Brown
Foreman Return Circuit, Switch and Signal Division
Cleveland Railway

Power trucks of the switch and signal division of the Cleveland Railway have been equipped with signal bells, so arranged that a workman on top of the tower may signal the driver regardless of the tower height or position of the turntable. This device is a great help to the trouble crews, especially when working under noisy traffic conditions. Current for the signal is obtained from the regular battery, tapped at the required voltage, the iron tower leg plates and turntable being utilized as current conductors. The signal bell is mounted in the drivers cab and the push button control is mounted on top of the tower within convenient reach

**Submitted in* Electric Railway Journal *Prize Contest.*



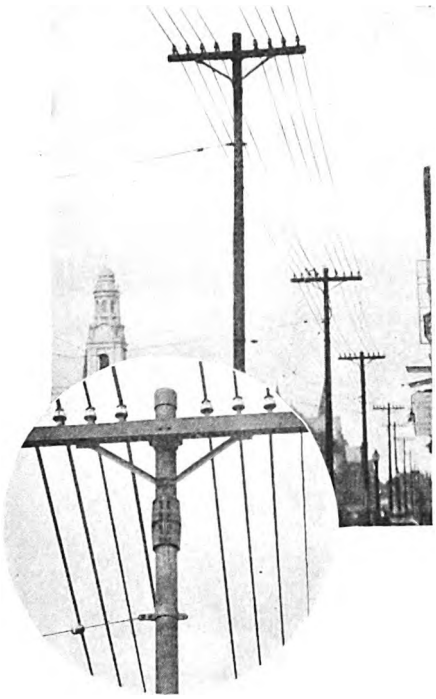
Wiring diagram of signal system installed on tower trucks of the Cleveland Railway

Digitized by Google

ot the workmen. In order to assure good electrical contact at all times between the tower leg plates and the table plate, reconstructed push buttons are used in which the center has been replaced by a piece of ¼-in. brass rod through which it is possible to pass current. The push buttons are mounted in each of the tower leg plates, with the binding posts electrically connected to the iron leg plates, and with the ¼-in. brass rod (under spring pressure) in sliding contact with the adjacent parallel tower leg plate. The same method is used for obtaining good electrical contact between the tower leg irons and the table plate. In this manner a closed circuit is provided when the control button is closed, regardless of the tower height or the position of the table. These bell installations have resulted in a saving of time both to the maintenance crews and to cars on the line approaching a point under repair.

Increasing Height of Span Wire Poles

FOLLOWING street widening operations in New Haven, an effective method was recently adopted by the Connecticut Company for increasing the height of its span wire poles. When the pole line was set back it became necessary to raise the height of the span wire connection to the pole in order to maintain the trolley wire at the proper elevation. This brought the span



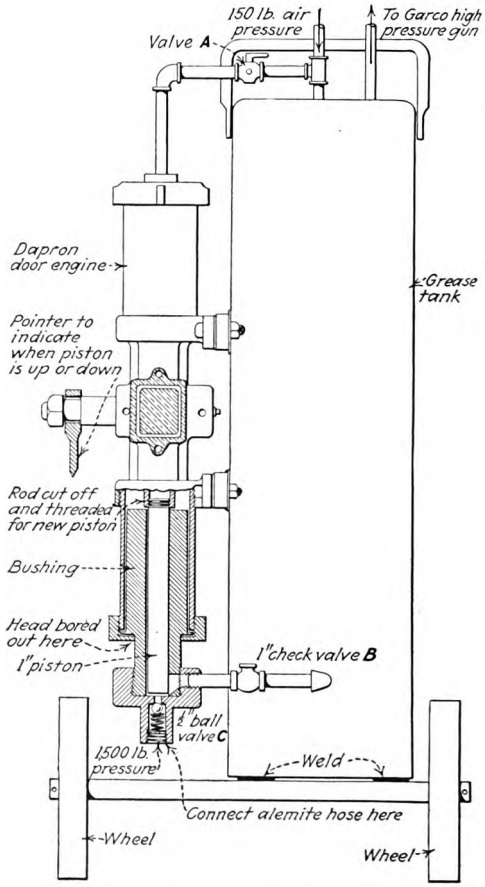
Pole height increased by clamping short extension to top of existing pole

wire too close to the feeder wires carried on crossarms at the top of the poles. Instead of installing taller poles, it was decided to add short sections of pipe to the top of the existing poles, holding the extensions in place by means of malleable iron clamps, as shown in the accompanying illustration. This permitted the necessary separation of the span wires and feeder wires without the expense of replacing the poles.

Door Engine Used for Pressure Lubrication*

By Charles Herms
General Foreman San Diego Electric Railway

FOR lubricating universal joints of the Spicer type, an obsolete door engine was reconstructed in the shops of the San Diego Electric Railway. With the aid of this apparatus, considerable time has been saved when universal joints had to be greased. A feature of this



Lubricating apparatus adapted from an old door engine by the San Diego Electric Railway Company

lubricator is that an indicator shows when the grease is entering the cylinder and when it is being pressed out and into the object to be lubricated. The apparatus has a nozzle pressure of 1,500 lb. and discharges 4 cu.in. of grease in ten seconds. It can be recharged in two seconds. To recharge the lubricator, a cock is turned to vent the air from the cylinder, after which the grease, under 150 lb. pressure, passes through the 1-in. check valve and forces the 1-in. piston up to its maximum position.

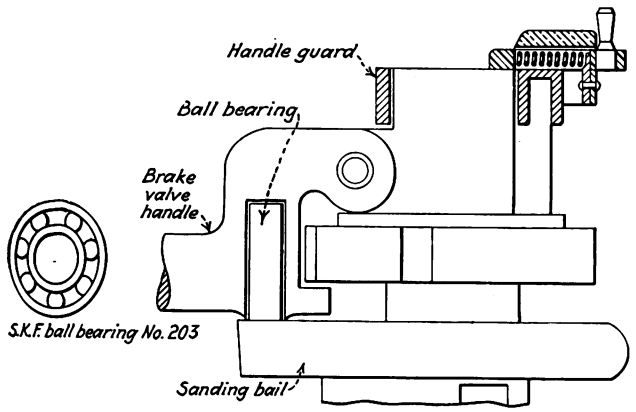
The Alemite hose also has a vent cock at the end which fastens on to the Alemite fittings. This is to permit the mechanic to cut off the flow of grease at will and at the same time release the pressure on the chuck so it can be removed from the fitting. A ½-in. ball valve is provided to prevent the compressed grease in the Alemite hose from expanding back into the 1-in. cylinder when releasing for recharge. The 1-in. bushing and head were made of an old car axle, while the piston of the same diameter has 0.002-in. clearance.

Digitized by Google

Ball Bearing Under Brake Handle*

By W. H. McAloney
Superintendent of Equipment Georgia Power Company Atlanta, Ga.

ELIMINATION of wear on the sanding slide of the M-28 brake valve in general use on safety cars has been accomplished by the Georgia Power Company by placing an S.K.F. ball bearing under the handle. Wear on the slide of the brake valve handle formerly caused many complaints by car operators. In order to eliminate this trouble a type S.K.F. No. 203 ball bearing has been



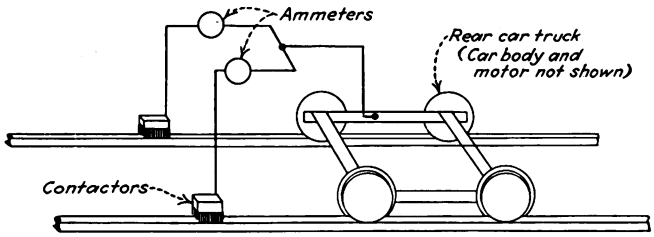
Ball bearing under brake handle has reduced wear of sanding bail on cars of the Georgia Power Company

installed in the brake handle, as shown in the accompanying illustration. This has greatly reduced the friction and overcome the wear on both brake handle and sand bail.

Detecting Broken Rails*

By Carl W. Evans
Underground Distribution Engineer San Antonio Public Service Company

FINDING the location of broken rails has been greatly facilitated on the lines of the San Antonio Public Service Company by means of a car equipped with a direct-current ammeter on each rail and two steel-wire brushes used as track contactors. When trying to locate broken rails, the car is driven slowly over the track to



Broken rail is detected by the sudden swing of one of the ammeters shunted across a short section of track

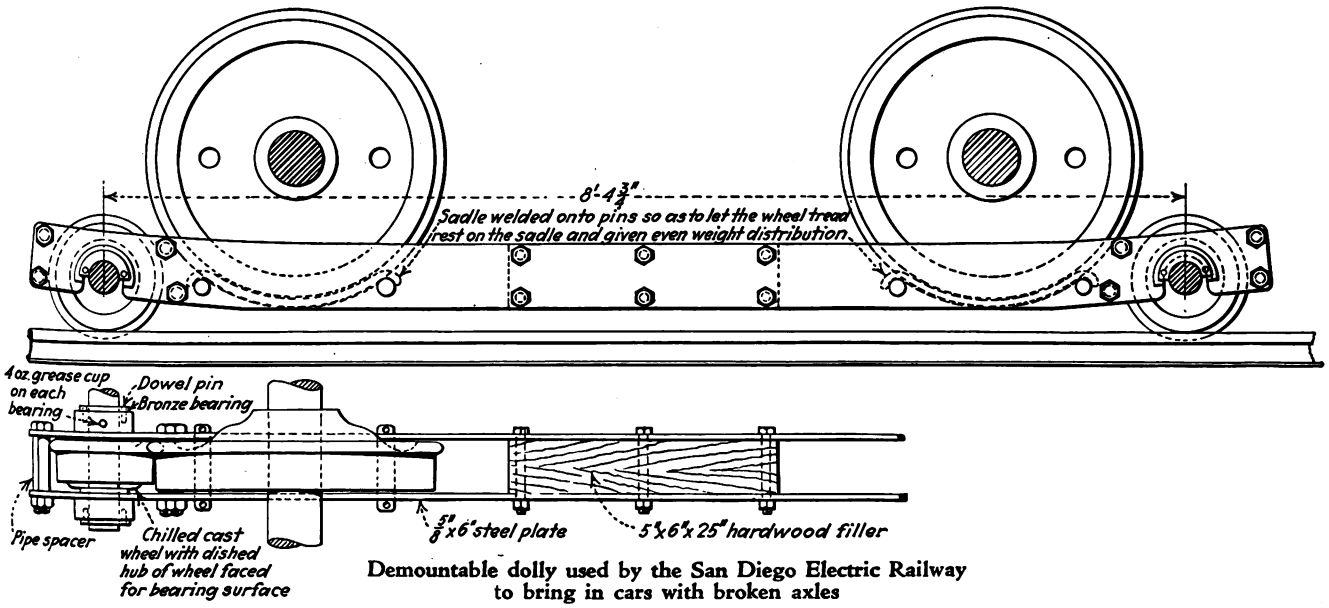
be tested. This is done after midnight when regular traffic has ceased, while one man is watching the ammeters. As long as continuity of the track is not broken the ammeters indicate only a small amount of current since they are shunted across only a short section of track. In passing over a broken rail, the ammeter shunted across the broken rail indicates almost the full car current during the interval that the break in the rail lies between the rail contactor and the wheels. If the car is traveling at a fair rate of speed the broken rail is indicated by a sudden swing of the ammeter, and notation is immediately made of the exact location.

Demountable Dolly Used in San Diego*

By Charles Herms
General Foreman San Diego Electric Railway

A DOLLY used by the San Diego Electric Railway to take the place of a street car's truck when one of the axles is broken consists of two axles with small wheels and two double side members resting on the axles, as shown in the accompanying illustration. This dolly can be assembled or taken apart in a few minutes. When using the dolly it is necessary to jack up the car, roll the dolly under it, and lower the car until the wheels rest on saddles between the sides of each member. Pins which support the saddles are made of 1½-in. steel bar. Due to the design of the dolly, the weight of the car is carried directly on the dolly wheels and no bending action is set up in the dolly axles.

**Submitted in* Electric Railway Journal *Prize Contest.*



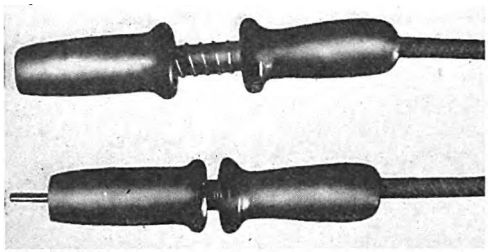
Demountable dolly used by the San Diego Electric Railway to bring in cars with broken axles

Digitized by Google

Insulating Sleeve Protects Test Points*

By T. E. Brindson
Electric Shop Foreman
Kansas City Public Service Company

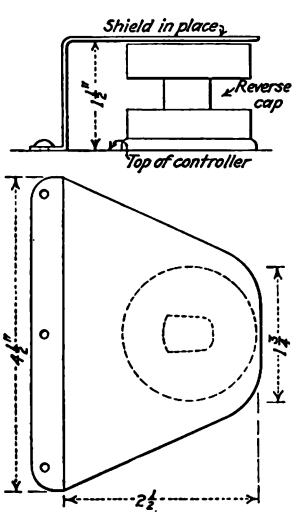
PROTECTION to the workmen engaged in testing electrical equipment in the shops of the Kansas City Public Service Company has been afforded by the development of an insulating sleeve which covers the positive test point. Previous to the development of this device both positive and negative test points were unprotected and workmen received electrical shocks on various occasions. With the new apparatus the negative point is left bare but the positive point is inclosed in fiber tubing inside a wooden sheath. When the apparatus is not in use this sheath covers the metal point, being held in position by a coiled spring. When it is desired to use the apparatus the sheath is pulled back thereby compressing the spring and leaving the test point exposed. This arrangement also provides protection for the test point should it fall on the floor or come in contact with grounded metal.



Fiber tubing in a wooden sheath protects positive point of electric testing apparatus. Above, sheath is in normal position over test point; below, the spring has been compressed, by pulling back the sheath and the test point is exposed

Reverser Protectors Prevent Tampering

By Benjamin H. Hall
Foreman West Penn Railways, McKeesport, Pa.



Sheet steel protectors on the reverse drums of controllers prevent tampering

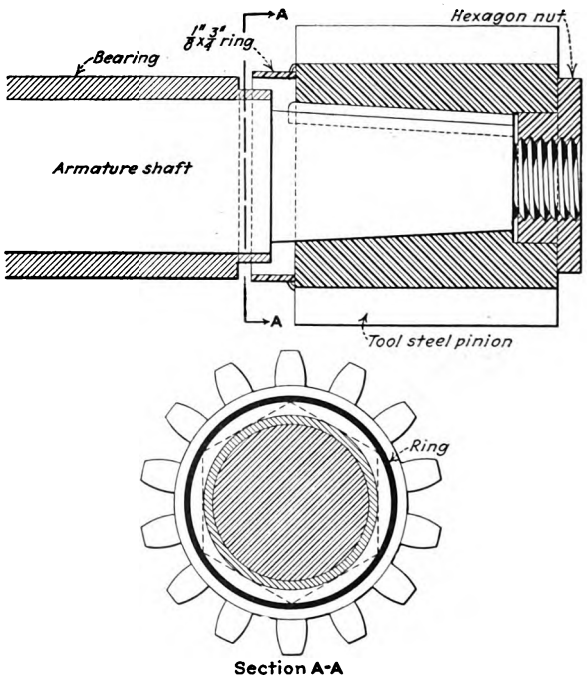
PROTECTORS have been installed on the tops of B-50 controllers by the West Penn Railways as a means of preventing passengers from turning the reverser barrels at the rear of the car with their hands. Without the shields it was found that passengers frequently would do this, making the rail brake inoperative or causing the motors to buck when the front end controller was turned on.

The protector is made of $\frac{1}{16}$-in. sheet steel and is fastened by means of three machine screws tapped into the top of the controller case. Dimensions and the method of installation are shown in the accompanying diagram. It costs little to install these shields and their use has removed a source of annoyance. As a safety precaution, they may save lives and damage to equipment.

Preventing Grease from Entering Armature Bearing

By W. B. Osborn
Master Mechanic
Southern Public Utilities Company
Charlotte, N. C.

TO PREVENT the heavy grease used for lubrication of gears from entering the armature bearing, the Southern Public Utilities Company, Charlotte, N. C., has adopted the practice of welding a ring to the pinion. This ring is placed against the pinion, on the opposite side from the nut which holds it on the armature shaft. A soft steel band of $\frac{1}{8}$x$\frac{3}{4}$-in. dimensions is used for the ring, the diameter depending on the size of the shaft. The bearing should be turned down at the pinion end in order to leave a little space between the bearing and the ring attached to the pinion. This method of preventing the heavy grease from entering the armature bearing has been used at Charlotte for several years and results have proved to be most satisfactory.



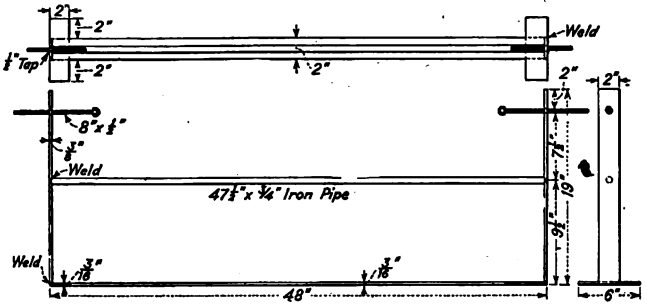
Ring attached to pinion prevents heavy gear grease from entering the armature bearing

Bus Wheel Aligner*

By W. R. Faircloth
Garage Foreman Virginia Electric & Power Company
Portsmouth, Va.

ACCURATE wheel alignment for buses of the Virginia Electric & Power Company at Portsmouth, Va., has been attained by the use of a wheel aligner, made in the company shops. The device used for this purpose has a base made from 2x$\frac{3}{16}$-in. flat iron with a

Digitized by Google



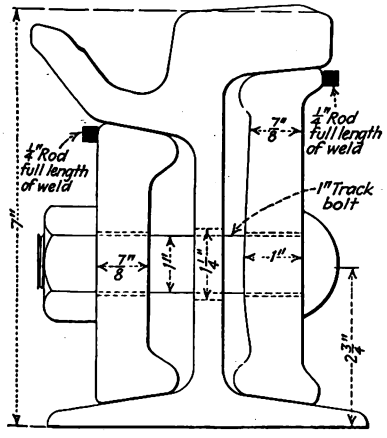
Aligner for wheels has reduced tire wear on buses of the Virginia Electric & Power Company

piece of ¾-in. iron pipe serving as a brace for two 19-in. uprights of 2x⅜-in. flat iron. Two ½-in. bolts 8 in. long are inserted through a ½-in. tap and can be so adjusted as to fit flush against the tire rims. In use the aligner is placed first in front of and then in the rear of the axle, permitting the mechanic to see at a glance whether or not the wheels are parallel. It was made at a cost of only $2.50. The life of tires has been greatly increased since the aligner has been in use, while the number of replacements is decreasing steadily.

Iron Rod Acts as Dam for Weld Metal*

By F. B. Habercam
Superintendent of Welding
United Railways & Electric Company
Baltimore, Md.

WHERE it is desired to electric seam weld rail joints fitted with standard bolted joint plates, the United Railways & Electric Company of Baltimore finds it effective to use a piece of ¼-in. square iron along the entire top edge of the plates as a dam for the weld metal. The ends are welded to hold the rod in place, and the usual welding procedure is then followed. This method applies where the splice bars are not disturbed, but whenever possible it is better to dismantle the joint and, while the splice bars are off, weld the ¼-in. square rod along the under side, to the bars. The joint is then reassembled and welded in the usual manner. The weld can be puddled so that the ¼-in. square rod, splice bar and rail are all thoroughly welded, with a maximum depth of penetration. This method may be used on any type of joint where there is not sufficient welding shelf on the splice bars. It applies particularly to cases of joint repairs to old bolted joint track, where it has been found satisfactory.



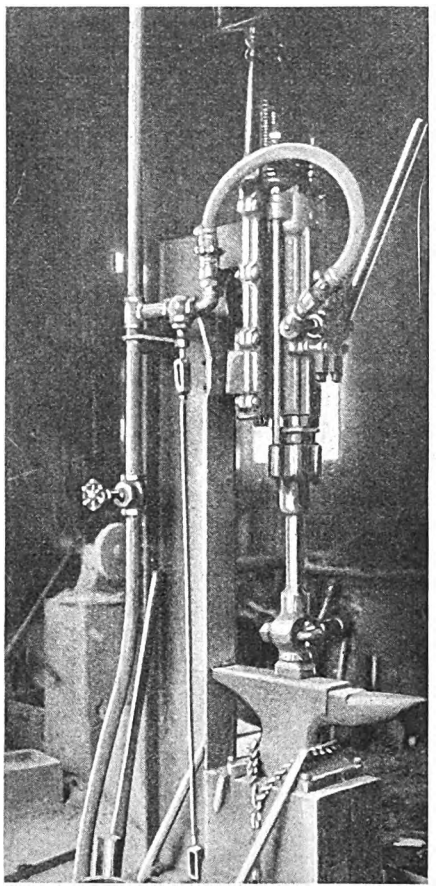
Iron rod is used by United Railways & Electric Company instead of copper as dam for weld metal in repairing rail joints

*Submitted in Electric Railway Journal Prize Contest.

Hammer Operated by Compressed Air*

By A. G. Pirkle
Assistant Engineer Roadway Department
Georgia Power Company
Atlanta, Ga.

BY CONVERTING an old 3⅝-in. rock drill into a compressed air hammer, the Georgia Power Company has obtained an efficient machine for maintaining roadway tools such as tampers, cleavers, picks, etc., on which there is a considerable amount of blacksmith work to be done. The drill was mounted on a 10-in. I-beam anchored 4 ft. in concrete, and fastened to it by 3¼x5-in. steel plates bolted to the flange of the I-beam with 10⅝-in. bolts. The plates were bent and the ends welded to the frame of the drill. A ratchet which caused the drill to rotate at each stroke was removed. The hammer was forged from tool steel to the desired size and shape, and the stem made to such diameter and length as to fit in the drill socket. The hammer is held in the socket with a 1-in. U-bolt, in the same manner as the drill. Air pressure of 100 lb. is used in operating the hammer and a foot control was installed whereby the air valve may be opened or closed as the case may be. The feedscrew in the top is used in raising or lowering the hammer to suit the various sizes of work. It is estimated that at least three times as much work can be done with the air hammer than with a hand hammer in the same amount of time.



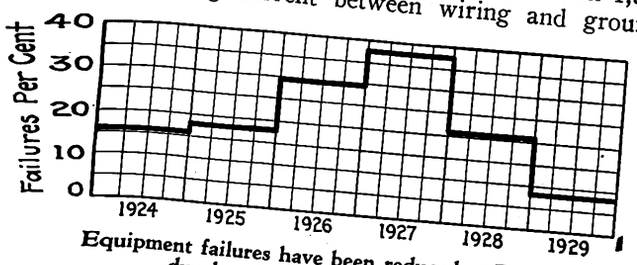
Air hammer made from an old rock drill speeds up blacksmith work in the track department of the Georgia Power Company

Digitized by Google

High Voltage Test Discloses Equipment Weakness

By H. S. Williams
Assistant Superintendent of Equipment
Department of Street Railways, Detroit

PREVENTION of equipment failures in service has resulted in Detroit from the use of a high voltage breakdown test. So successful has it been that the Department of Street Railways now makes it a practice to give all cars coming into the shops a test with 1,500 volts alternating current between wiring and ground.



Equipment failures have been reduced at Detroit, due largely to high voltage tests

During 1924 and 1925, when this system was first used, not all incoming cars were tested, so the maximum benefit was delayed. In 1927, however, all were "shot" with a resulting breakdown of 38 per cent of the cars. The following year the number of cars which showed failure was reduced to 21 per cent and so far this year further reduction is apparent. In 1924 when these high potential tests were started the record showed a little over 7,000 miles per pull-in while the 1929 record shows over 14,000 miles. While this improvement is not due entirely to the high voltage testing, a large share of it is attributed to this method of detecting weakness.

Portable Oxyacetylene Apparatus*

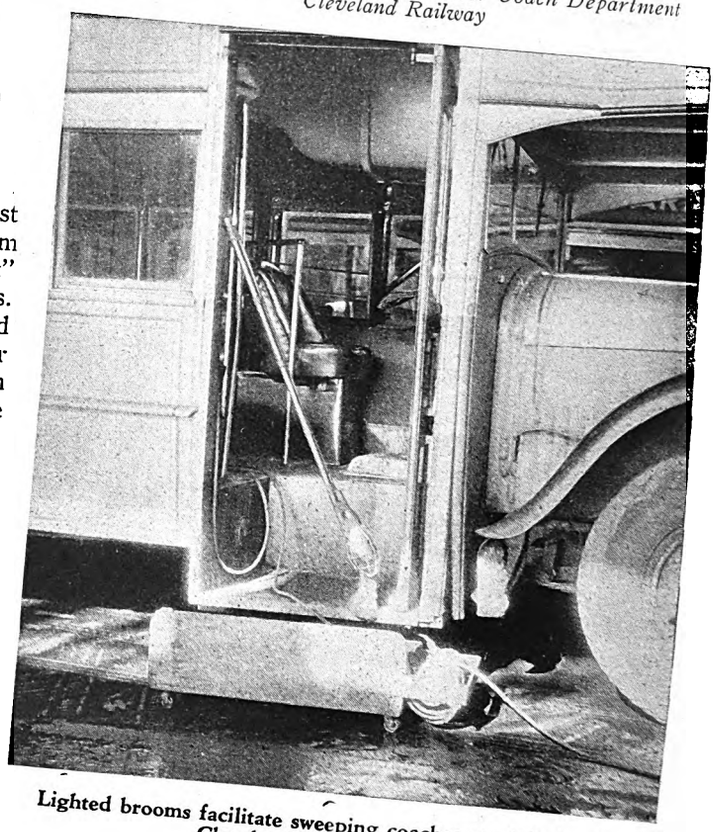
By A. B. Copeland
Superintendent of Construction Way Department
Cleveland Railway

TO ELIMINATE the cumbersome handling of an oxyacetylene burning outfit, the Cleveland Railway has designed a special truck to carry the necessary apparatus. Often it was found that trucks or cars equipped with cutting equipment could not reach desired spots because insufficient room was available for maneuvering. The small carriage developed to solve this problem can be moved into any small space. It is mounted on two wheels of 12½-in. diameter, and when not in use stands in an upright position. A platform to support the tanks is made of two layers of 1½-in. oak plank, two holes being cut in the top layer to accommodate the lower ends of the tanks. This arrangement, together with a metal clamping strap at the top, holds the tanks firmly in position. A removable box, attached to the top of the truck, contains gages, tools and other implements. In the lower compartment of this box is a special space for carrying the hose. The weight of the carriage, equipped, is 600 lb.

Portable truck for oxyacetylene burning outfit used by the Cleveland Railway

Lighted Brooms Help Coach Cleaners*

By Hoy Stevens
Superintendent of Maintenance Motor Coach Department
Cleveland Railway



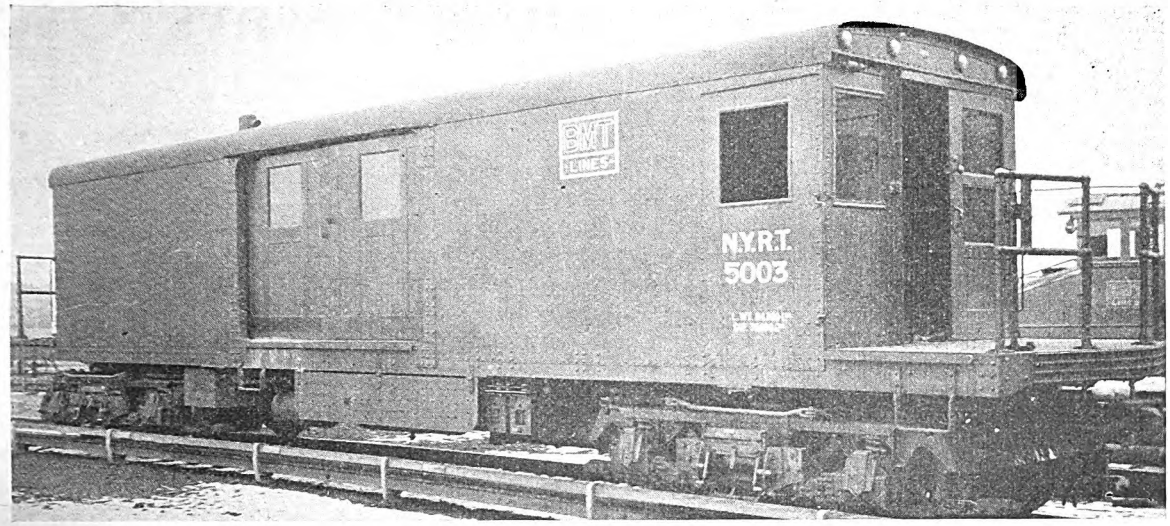
Lighted brooms facilitate sweeping coaches at night in the Cleveland Railway garage

ILLUMINATED brooms are one of the novelties developed in the coach maintenance department of the Cleveland Railway. The unit, as illustrated, consists of a broom, lamp, wire guard, extension cord and reel, the latter mounted on a standard dust box. The outfit is simple, and was made from ordinary garage supplies.

With this arrangement it is possible to illuminate any part of the floor of the coach, regardless of its location in the garage, and with little or no delay from short or tangled extension cords. The dust box can be run under the rear door of a double-deck coach or the front door of a single-deck coach. The floor can be swept thoroughly and dust and dirt seen where formerly they were not noticed, on account of the dark. The garage lights were found of little value and even the interior lights of the coach did not illuminate under the seats, in corners or under heater pipe guards. Morever, when the battery voltage was low the lighting was poor and it was not advisable to keep all the lights on for the time needed to do the cleaning.

**Submitted in* Electric Railway Journal *Prize Contest.*

Digitized by Google



Exterior of B.-M.T. mechanical department supply car

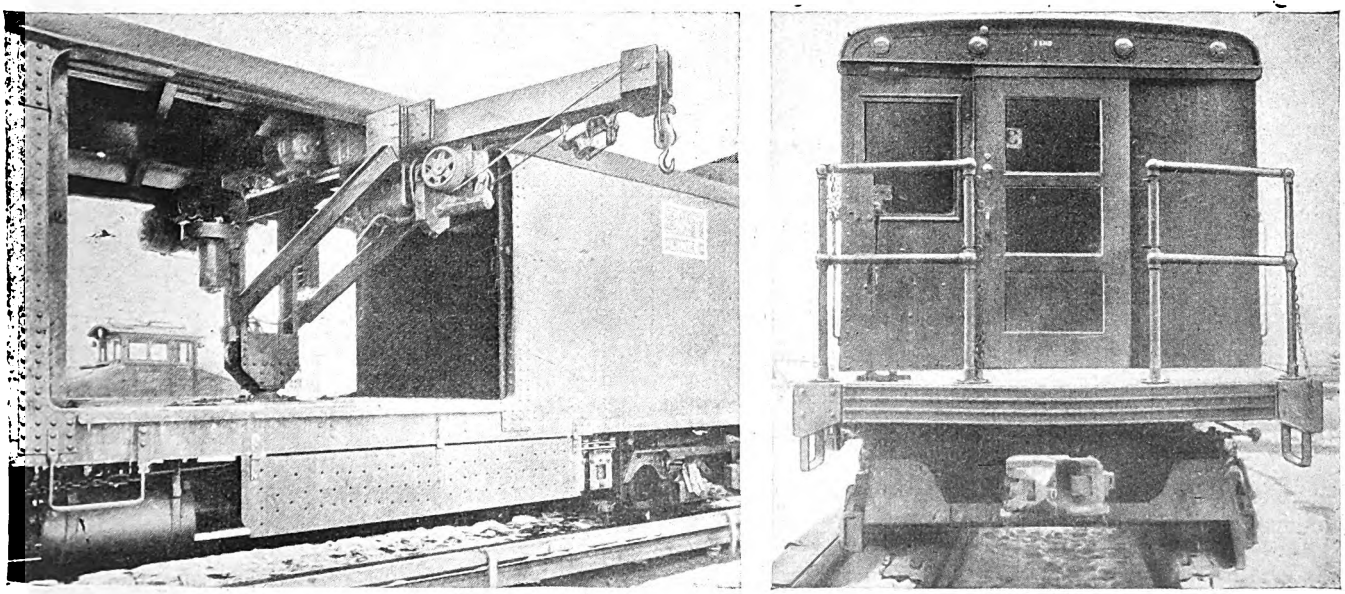
Supply Car for B.-M.T. System

WHILE repairs to equipment for subway and elevated cars of the Brooklyn-Manhattan Transit System ordinarily are made at the Coney Island shops, it is frequently necessary to change armatures, field coils and wheels at other shops. To transport material to and from various shops a supply car is used. The car used for this purpose is provided with equipment for rapid and easy handling of heavy parts and for safe and convenient storage during transportation.

The car is equipped with a 2-ton circular crane in the center portion which is arranged to handle material in and out of the side doors. This crane is electrically operated and easily lifts and lowers material that formerly had to be loaded and unloaded upon flat cars or in box cars by manual labor when transported from one shop to another. The crane is circular and may be swung out either side of the car when the doors are open, and an electrically-operated extension may be projected from the arm, if it is necessary, and then withdrawn back inside the arm when the crane is ready to be swung back into the car. A switch near the motorman's cab controls the power for the operation of the crane, so that it cannot be operated unless the switch is thrown in place. This is one of many safety features governing the operation of the crane.

Loading and unloading are done by the shop forces and not by the car crew. A shopman at each shop is instructed in the operation of the crane and his task on the arrival of the car is to operate it. The car resembles a U. S. mail car in appearance, with sliding doors on either side. It is painted red and has the symbol of the B.-M.T. Lines in colors. It is 48 ft. 3 in. over all and is 8 ft. 7 in. wide. The car body itself is 37 ft. 6 in. long with open platforms at either end on which guard rails are mounted.

About 72 sq.ft. of open storage space is provided at one end of the car for large size material, while the other end is occupied by steel lockers which are suspended from the ceiling. These are used for small size material and for broken lots. Room is also provided for the storage of some material under the lockers. The center of the car is taken up by the crane.



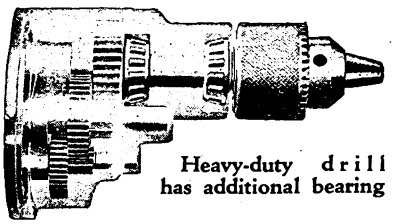
The circular crane is swung out of the door with extension projecting. At right, end view of the car

Digitized by Google

New Products for the Railways' Use

Chuck Spindle Equipped with Roller Bearings

TO PROVIDE for double thrust which occurs in cylinder reconditioning work, an additional roller bearing has been introduced in the chuck spindles of the $\frac{5}{8}$-in. and $\frac{3}{4}$-in. heavy-duty drills manufactured by



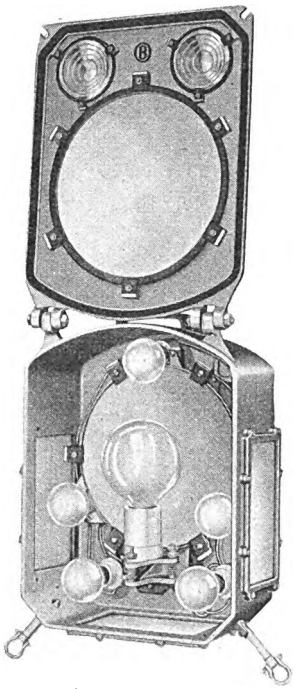
Heavy-duty drill has additional bearing

the United States Electrical Tool Company, Cincinnati, Ohio. It is claimed that this additional bearing facilitates operation and prolongs the life of the drill.

Special Dash-Illuminating Headlight

INCORPORATING the advantages of the standard O-B Type DCP 500-watt incandescent headlight, a new interurban light has been designed which illuminates the car dash and also provides sufficient track illumination for city and suburban service. Completely enclosed in an aluminum case, weighing only 29½ lb., it is fitted with a heat-resisting plain glass lens in the door, an 11-in. glass reflector and a 500-watt incandescent lamp set in a mogul receptacle making it possible to pick up dark objects as far away as 1,500 ft. in clear weather. Dash illumination is furnished by means of five smaller lamps connected in series and arranged to direct the light beams through prismatic lenses set in the sides and bottom of the headlight case. When in use in interurban service, the 500-watt lamp with the aid of the prisms supplies the dash as well as the track illumination. Dimming is accomplished by cutting out the large light and only employing the five small lights, using a single switch fitted with two on and one off positions. Two of the five smaller lights are set directly behind 4-in. semaphore lenses in the bottom of the door. These lights are sufficient to pick up switch points while traveling at a moderate rate of speed.

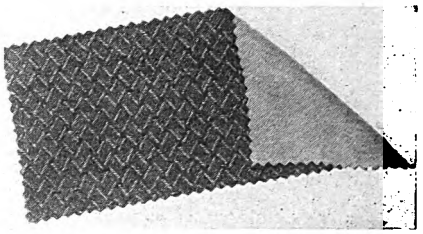
This new headlight is made for either portable or stationary mounting and can be used on any car wired for 4-amp. headlights, and using resistances of 500 watts and 115 volts. The five small lights are interchangeable with the lights used inside the car within the range of 23 to 56 watts. This apparatus is designed to provide adequate illumination at all times.



Headlight manufactured by the Ohio Brass Company illuminates both dash and track

Waterproof Upholstery Material

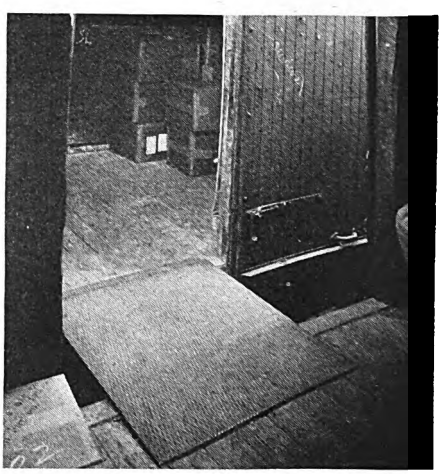
NUMEROUS advantages are claimed for a new waterproof upholstery material recently brought out by Lesher-Whitman & Co., Inc., 881 Broadway, New York. The front surface of this material is mohair cloth while the back is coated with 14-oz. rubber. Since moisture does not damage the fabric, it can be cleaned by washing in the regular way. The smooth, hard surface is said to retain its original freshness for a long time. It is also moth proof and vermin proof. These qualities are said to make it an extremely serviceable material for upholstering the seats of electric railway cars and buses.



A new upholstery material with mohair surface and rubberized back

Car Loading Plate with Patterned Surface

LOADING of freight cars is said to be facilitated by use of a "diamondette" plate developed by the Alan Wood Steel Company of Conshohocken, Pa. This plate is rolled from open hearth steel, of either $\frac{5}{16}$-in. or $\frac{3}{8}$-in. thickness. It has a raised, patterned surface which will accommodate the smallest of truck wheels without jolting or shifting the load. The raised diamonds give the truck operator a firm foothold, the absence of which in plain plates has created a certain hazard. "A.W." diamondette car loading plates are flanged on one end and bevelled on the other end. This construction automatically gives the plate a grip on both car floor and platform as soon as the load comes on to the plate.



Patterned loading plate facilitate car loading

Digitized by Google

Monthly and Other Financial Reports

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Market Street Railway, San Francisco, Cal.					
February, 1930	728,404	678,268*a*	.....	100,136	44,224*j*
February, 1929	724,808	629,915*a*	.....	94,893	34,852*j*
12 mo. end. Feb., 1930	9,585,605	8,028,102*a*	.....	1,557,503	856,289*j*
12 mo. end. Feb., 1929	9,683,273	8,292,217*a*	.....	1,391,056	654,679*j*
Jacksonville Traction Co., Jacksonville, Fla.					
January, 1930	94,815	80,597	9,271	4,525*b*	.....
January, 1929	97,358	77,139	9,683	10,012*b*	.....
12 mo. end. Jan., 1930	1,138,597	932,048	108,478	92,045*b*	*66,055*
12 mo. end. Jan., 1929	1,192,756	964,371	107,033	114,895*b*	*48,303*
Honolulu Rapid Transit Co., Honolulu, Hawaii					
January, 1930	86,856	54,506	8,819	24,771	12,943
January, 1929	88,606	51,591	12,861	25,375	14,164
Chicago Surface Lines, Chicago, Ill.					
January, 1930	5,239,755	4,043,147*a*	.....	1,196,608	909,248*c*
January, 1929	5,400,638	4,236,029*a*	.....	1,164,610	887,843*c*
Chicago Surface Lines, Chicago, Ill.					
February, 1930	4,751,766	3,900,460*a*	.....	851,306	711,622*c*
February, 1929	5,014,245	4,017,519*a*	.....	996,726	785,195*c*
United Railways & Electric Co., Baltimore, Md.					
January, 1930	1,423,517	987,151	141,261	306,012	24,005
January, 1929	1,387,494	977,061	136,634	286,127	2,326
Boston Elevated Railway, Boston, Mass.					
January, 1930	3,101,063	2,087,830	133,033	891,811	195,210
January, 1929	3,072,585	2,155,799	146,888	780,384	74,244
Eastern Massachusetts Street Ry., Boston, Mass.					
February, 1930	684,616	418,490	29,090	247,197	67,278
February, 1929	726,869	437,655	32,695	271,772	79,797
2 mo. end. Feb., 1930	1,443,429	866,775	66,846	529,557	149,734
2 mo. end. Feb., 1929	1,523,272	928,746	68,412	558,603	160,489
Department of Street Railways, Detroit, Mich.					
February, 1930	1,922,327	1,568,683	65,090	297,112	158,026
February, 1929	2,248,074	1,830,216	62,516	362,386	242,466
12 mo. end. Feb., 1930	25,883,821	20,645,509	756,068	4,588,792	2,897,415
12 mo. end. Feb., 1929	25,210,645	19,795,532	774,108	4,874,814	3,020,617
Kansas City Public Service Co., Kansas City, Mo.					
February, 1930	689,173	576,085*a*	.....	113,089	38,488*g*
February, 1929	724,758	.....	.....	.....	57,760*g*
2 mo. end. Feb., 1930	1,451,109	.....	.....	.....	80,230*g*
2 mo. end. Feb., 1929	1,505,233	.....	.....	.....	128,930*g*
Illinois Terminal Co., St. Louis, Mo.					
January, 1930	577,391	421,931	24,000	131,461	84,226*e*
January, 1929	625,190	424,748	21,262	179,160	135,303*e*
St. Louis Public Service Co., St. Louis, Mo.					
December, 1929	1,649,588	1,213,820	167,781	276,920	127,413
December, 1928	1,656,372	1,026,067	177,217	448,419	292,118
12 mo. end. Dec., 1929	19,249,779	14,326,528	1,922,814	3,005,363	1,155,461
12 mo. end. Dec., 1928	19,451,917	14,616,828	1,885,450	2,916,566	1,043,401
Omaha & Council Bluffs Street Railway, Omaha, Neb.					
January, 1930	236,776	186,397	.....	10,870	*36,450*
January, 1929	262,443	186,387	.....	47,358	1,138
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
January, 1930	94,674	68,018	4,800	27,113	*3,899*
January, 1929	89,222	64,785	7,840	19,042	*12,573*
Brooklyn-Manhattan Transit Corp., New York, N. Y.					
February, 1930*f*	4,628,946	3,020,029	340,311	1,339,361	569,829
February, 1929	3,687,623	2,309,625	278,152	1,156,008	438,909
8 mo. end. Feb., 1930*f*	40,172,997	26,825,506	2,593,973	11,340,666	5,136,488
8 mo. end. Feb., 1929	31,800,539	20,616,110	2,219,268	9,568,432	3,984,859
Brooklyn & Queens Transit Corporation, New York, N. Y.					
February, 1930	1,775,394	1,383,112	114,014	297,995	171,777
February, 1929	1,809,557	1,463,427	104,835	262,345	133,606
8 mo. end. Feb., 1930	15,682,525	12,352,784	914,683	2,585,683	1,575,311
8 mo. end. Feb., 1929	15,880,622	13,192,947	843,565	2,006,023	976,362
Fifth Avenue Coach Co., New York, N. Y.					
October, 1929	525,185	460,847*a*	.....	76,770	76,042
October, 1928	585,673	479,999*a*	.....	106,130	103,640
4 mo. end. Oct., 1929	2,199,959	1,778,922*a*	.....	409,326	406,760
4 mo. end. Oct., 1928	2,321,584	1,845,923*a*	.....	432,853	422,894
Hudson & Manhattan Railroad, New York, N. Y.					
February, 1930	992,769	497,424	.....	495,345	161,096
February, 1929	992,536	501,781*a*	.....	490,754	155,354
2 mo. end. Feb., 1930	2,080,454	1,046,635*a*	.....	1,039,818	361,951
2 mo. end. Feb., 1929	2,053,427	1,047,726*a*	.....	1,005,700	334,782
Interborough Rapid Transit Co., New York, N. Y.					
January, 1930	6,407,365	3,885,013	210,522	2,311,829	*210,339d*
January, 1929	6,081,211	3,810,916	203,735	2,075,559	278,382*d*
7 mo. end. Jan., 1930	42,157,170	26,381,006	1,412,955	14,363,208	*1,139,508d*
7 mo. end. Jan., 1929	39,743,556	24,884,036	1,402,830	13,456,689	853,983*d*
Long Island Railroad, New York, N. Y.					
January, 1930	2,929,253	2,346,899	99,372	482,882	341,626*e*
January, 1929	2,904,424	2,264,348	91,756	544,973	409,699*e*
New York, Westchester & Boston Ry., New York, N. Y.					
January, 1930	211,322	122,640	24,308	65,093	*166,494*
January, 1929	190,835	130,851	18,793	41,911	*172,616*
Staten Island Rapid Transit Co., New York, N. Y.					
January, 1930	188,377	152,249	17,500	18,628	9,879*e*
January, 1929	228,151	176,209	19,000	32,937	*1,782e*
Philadelphia & Western Railway, Norristown, Pa.					
January, 1930	62,319	53,043	.....	.....	9,276
January, 1929	65,624	55,543	.....	.....	10,081
12 mo. end. Jan., 1930	801,663	630,388	.....	.....	171,275
12 mo. end. Jan., 1929	838,698	656,765	.....	.....	181,933
Philadelphia & Western Railway, Norristown, Pa.					
February, 1930	52,923	51,190*h*	.....	.....	1,733
February, 1929	58,218	51,353*h*	.....	.....	6,865
2 mo. end. Feb., 1930	115,242	104,233*h*	.....	.....	11,009
2 mo. end. Feb., 1929	123,842	105,896*h*	.....	.....	17,946
United Electric Railways, Providence, R. I.					
December, 1929	643,070	588,373	.....	54,697	5,217
December, 1928	656,657	605,758	.....	50,899	*557*
12 mo. end. Dec., 1929	7,193,230	6,272,354	.....	1,007,506	397,237
12 mo. end. Dec., 1928	7,423,475	6,482,551	.....	1,027,483	410,597
Galveston-Houston Electric Railway, Houston, Tex.					
January, 1930	41,658	24,921	2,658	14,078	.....
January, 1929	46,782	26,882	2,574	17,325	.....
12 mo. end. Jan., 1930	579,366	327,059	32,441	220,058	*49,859*
12 mo. end. Jan., 1929	639,405	367,301	31,753	240,350	*29,769*
Houston Electric Co., Houston, Tex.					
January, 1930	271,140	175,685	23,422	72,032	.....
January, 1929	281,336	181,205	25,499	74,630	.....
12 mo. end. Jan., 1930	3,365,661	2,080,284	271,848	1,028,328	630,538
12 mo. end. Jan., 1929	3,355,797	2,073,295	291,505	990,995	578,946
Pacific Northwest Traction Co., Seattle, Wash.					
January, 1930	76,618	59,628	5,813	11,175	.....
January, 1929	69,452	63,565	5,589	297	.....
12 mo. end. Jan., 1930	971,238	713,439	54,400	203,397	84,756
12 mo. end. Jan., 1929	879,345	741,635	52,323	85,386	*64,048*
Calgary Municipal Railway, Calgary, Alta.					
January, 1930	99,705	54,199	.....	45,506	19,791
January, 1929	.....	.....	.....	.....	16,243
Edmonton Radial Railway, Edmonton, Alta.					
January, 1930	85,235	53,022	.....	32,213	2,327
January, 1929	79,112	46,258	.....	32,854	3,506
Regina Municipal Railway, Regina, Sask.					
January, 1930	48,149	28,693	.....	19,456	7,662
January, 1929	.....	.....	.....	.....	7,730

a Includes taxes. *b* Net operating revenue. *c* Balance for return on investment. *d* In 1930 payment for rental on Contract No. 3 of $737,996 for January and $2,947,966 for the seven months were made to the city of New York which were not made in 1929. *e* Net after joint facility and equipment rents. *f* Including Brooklyn & Queens Transit System. *g* Before reserves. *h* Operating and income deductions. *j* Before depreciation and federal taxes.

Business Conditions Show Improved Trend

ROBERT M. DAVIS, statistical editor of the McGraw-Hill Publishing Company, Inc., publisher of ELECTRIC RAILWAY JOURNAL, says there is little doubt but that the closing weeks of the first quarter of the year witnessed a distinct upward trend in general trade and industrial operations. He has just returned from a 17,000-mile tour which covered every section of the United States, and advances as a composite view of business men that while current business is only fair and collections are slow, both are decidedly more favorable than was thought possible last November and that material improvement may be expected as the spring opens up. Mr. Davis sees the general business and industrial outlook for the second quarter as well as for the remainder of 1930 distinctly favorable as the first quarter closes. With most of the industrial groups, including general construction, now definitely on the upgrade, and general trade expanding with the unusually late spring demands, prospects are brighter than at any time since the recession set in last fall. Admittedly, the first quarter of the year was definitely one of adjustment to an entirely different economic plane, but the year 1930 promises to stand out as one of unusual stability in trade and industry. Mr. Davis feels that the closing months of 1930 should witness the opening of a period of prosperous business and industrial operations.

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Seattle, Wash.—Roy E. Furse, superintendent of transportation for the municipal railway and bus system, requests operators so to regulate the running time of buses that they will arrive at transfer points just about the time street cars arrive with which their service must connect. He is endeavoring to arrange schedules so as to help make meetings easy.

✦

Philadelphia, Pa.—Trial operation of the $10,000,000 South Broad Street subway begins when the first train is run from the City Hall to South Street. Thorough tests for clearance and operation of switches and signals are being conducted under supervision of Transit Director Myers and H. M. Van Gelder, electrical engineer of the department.

✦

Fort Worth, Tex. — The Northern Texas Traction Company is reported to contemplate the removal of its tracks from these thoroughfares when the work of widening and repaving Azle Avenue and 25th Street from North Main Street to the city limits is begun by the city early in May. The plan is to substitute service by bus. It has been stated unofficially that seven new vehicles will be bought for this service, but up to March 25 the new equipment had not been ordered although the orders were said to be pending.

✦

Louisville, Ky. — Employees of the Louisville Railway operated an average of 42,264 miles per accident in February. Five street railway lines and seven bus lines were operated with a record of 100 per cent safety during the month.

✦

Albany, N. Y.—Ernest Murphy, president of the New York Electric Railway Association and executive of the United Traction Company, Albany, made a plea to the Legislature on March 25 to relieve the trolley lines of the state of the costs of the paving between their tracks under the terms of the so-called Thayer bill.

✦

Chicago, Ill.—Tuesday, June 17, has been set tentatively by the City Council's local transportation committee as the date for submitting the new railway co-ordination ordinance to a referendum vote in Chicago. If the referendum is not held by that date the committee members are confident that it will be within two or three weeks from then. A special election would be called, to be paid for out of the city's traction fund.

✦

San Francisco, Cal.—The Board of Public Works has directed Fred Boeken, superintendent, Municipal Railway, to install meters on municipal street cars to check the amount of power used.

(Late News Continued on Page 232)

The Interstate Bus Bill Passed by House March 24

Regulatory Measure Providing Board of Administration Amended Slightly. Large Majority Recorded. Goes Now to Senate for Approval

WITH slight amendments to the grandfather clause and the administrative sections, the House passed the Parker interstate bus bill on March 24 by a vote of 219 to 115. Although the opposition was somewhat more pronounced than had been expected it was not altogether surprising to House leaders, who anticipated that effective use would be made of the "state rights" argument. Despite these protests and the objections of those opposed to bus operation by steam and electric railways, it was evident during the passage of the bill that the majority of the House members do not look with suspicion upon long-distance operations by large companies.

This was indicated by the ease with which amendments were voted down that sought to prevent the acquisition of interstate bus lines by competing carriers. Other amendments designed to restrict bus operations by steam carriers and electric railways also were rejected. It was decided, however, to adopt a provision to permit the establishment of competing service in cases where the existing bus line is operated or controlled by a railroad. In this connection, the charge was made that the bill was not conceived to answer public demand, but was written by the steam and the electric railways.

The administrative section was amended so as to provide for the extension of greater regulatory powers to the state groups at the discretion of the Interstate Commerce Commission. In bus operations covering no more than three states, the groups of state commissions already are permitted to initiate regulation. The amendment allows the Interstate Commerce Commission to refer matters pertaining to regulation to groups of more than three states. At the suggestion of members of the committee that drafted the bill, it was agreed to make decisions by the state groups by a majority of the members rather than by unanimous consent, as was provided in the original language.

It was also decided to permit the state boards to waive such matters of regulation as they may agree upon and to allow the Interstate Commerce Commission to make direct determination of the points involved. In this manner, smoother enforcement is provided and the state boards are relieved of the necessity of deciding questions considered of minor importance, it was stated. As to the grandfather clause, as the section is called dealing with the issuance of certificates for operation, an amendment was adopted that extends the time of priority of operation from Jan. 1 to March 1, 1930. It is thus provided that bus lines that were in operation on March 1 shall be given prior consideration in the issuance of the authorizing certificates.

The bill now goes to the Senate.

COMING MEETINGS

April 4—Metropolitan Section, A.E.R.A., Engineering Societies Building, New York.

April 9-10 — Central Electric Railway Master Mechanics Association, Mansfield, Ohio.

April 29-May 1—United States Chamber of Commerce, Washington, D. C.

May 14-15—Association of Electric Railway Equipment Men, Middle Atlantic States, Scranton, Pa.

June 23-26—American Electric Railway Association, 49th annual convention, San Francisco, Cal.

July 23-25 — Electric Railway Association of Equipment Men, Southern Properties, Nashville, Tenn.

Fare Case on Chicago "L" Dragging

Corporation Counsel Ettelson of Chicago, called upon by the City Council three months ago to explain his handling of the elevated rate case, has failed to meet the Council's demand. His reply to inquiries is "too busy." The plea of the Chicago Rapid Transit Company made to the Illinois Commerce Commission two years ago, was backed by a mass of testimony in favor of increased fares, but was combatted by only one witness for the city. Attorneys for the "L" lines obtained the raise in a temporary injunction from the federal court, and there the matter has rested. Two weeks ago Mr. Ettelson sought an order from the federal court to force the city to appropriate money to enable him to continue litigation, which involves appraisal of the properties of the elevated company. The Council also asked Mr. Ettelson to report on the leases under which the Chicago, North Shore & Milwaukee, the Aurora, Elgin & Chicago and other lines enter Chicago over the tracks of the "L" and on the question whether the federal court has any jurisdiction to rescind or revise these leases.

Digitized by Google

New Snow Fighting Methods Adopted in Buffalo

Alertness of International Railway Wins Editorial Commendation from Local Newspapers—Plea for Public Co-operation Effective

LAST winter the International Railway, Buffalo, N. Y., maintained the largest snow-fighting fleet of equipment in its history. It comprised 30 plows of two different types, 23 sweepers, one ice cutter and 18 trucks to sand viaducts as well as to transport switch and shovel gangs from point to point.

Parked cars rob the city of the use of half the street, forcing snow fighters to readjust their equipment to clean around the parked cars

Within the city limits of Buffalo, the company operates 220 miles of track and its total system covers 450 miles of track. During the winter, the company kept a staff of more than 200 men ready for snow fighting. Men who do this work are paid on a basis of time and a half for actual time on the snow-fighting equipment.

While snow fighting was at its peak during December, the company placed a poster in all stations commending car operators for their helpful co-operation. This poster said:

I.R.C. Co-operators:
Every one of you is to be heartily congratulated and commended for your super-cooperation during the many trials we have endured during the past week.
Beset by almost every conceivable handicap—sleet, snow and the partial destruction of our car shops, capped by the severe blizzard on Friday—every man on the system threw himself into the fray and made it possible for I.R.C. to continue its service to the Niagara area.
I wish I might shake the hand of every one of you—your accomplishment makes me more proud than ever of the splendid body of I.R.C. men for whom no task is too great.

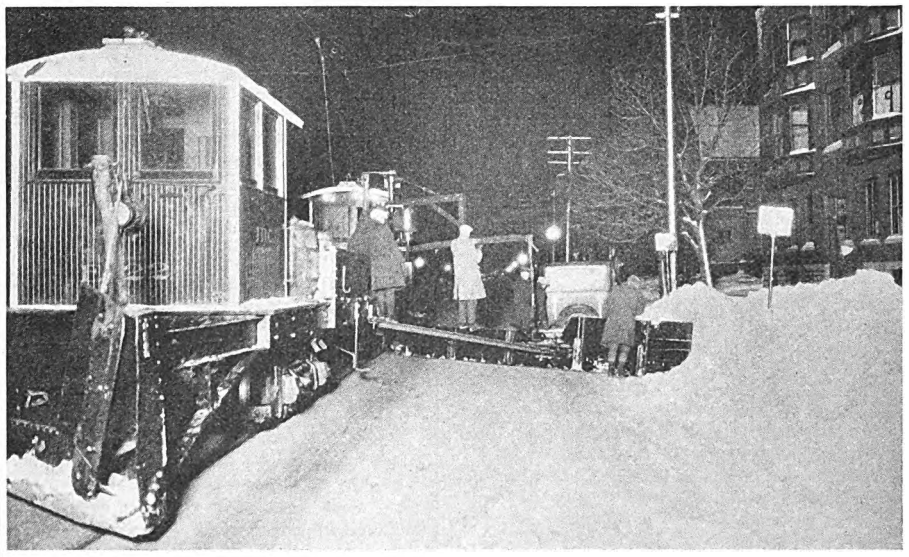
B. J. Yungbluth, President.

Folders placed in the "Read As You Ride" boxes on all street cars and buses urged the public to co-operate in the effort to fight snow and keep traffic moving. A bulletin signed by President Yungbluth gave five suggestions for helping to maintain adequate service. They were:

Clear only such sidewalk space as is necessary for free movement of pedestrians.
Heap all snow along the curb. Avoid throwing it into the street.
Discourage parking on main arteries and all-night parking on any trolley street.
Discourage the practice of backing trucks to the curb.
Encourage your motoring friends to keep clear of street car tracks, when they can, so that the vast majority of users of city streets, who ride the street cars, may have an unobstructed right-of-way, and may reach their destinations without delay.

Letters embodying similar recommendations were sent by President Yungbluth to officials of all the community business organizations in Buffalo with the suggestion that the recommendations be given the widest possible publicity. The company pointed out in these letters that all-night parking on streets where car lines are operated interrupts the efficient cleaning of the streets of snow from curb to curb, thus forcing motor vehicle traffic into the car tracks with subsequent delays and congestion.

Formerly the railway cleared its own tracks and left the accumulated snow along the rails where it was removed by the city operating large fleets of snow plows. As a result thousands of automobiles and trucks attempted to get through the narrow lane cleared for street cars, causing partial paralysis of traffic. To meet this problem, the railway redesigned and rebuilt its entire snow-fighting equipment. Wings that reach all the way to the street curb were attached to special heavy car bodies with the result that during the recent winter the company cleared snow from all streets upon which it operates cars from curb to curb. This placed an additional financial burden upon the company, but it eliminated traffic congestion almost entirely so that the number of cars reported on time at terminals reached a new high figure.



Midnight photograph showing how a parked automobile blocks the snow fighters in their effort to rid the streets of snow from curb to curb

Ambitious New Jersey Rapid Transit Plan Revived

Officials of the North Jersey Transit Commission have announced their intention to submit to Governor Morgan F. Larson within the next two weeks a recommendation for enactment of pending legislation to create a rapid transit financing body.

The pending bill calls for creation of a district or regional plan organization, in the nature of a public corporation, to finance any or all of the comprehensive program included in the 1926 report.

The legislation now pending in Trenton would, if passed, provide the machinery for carrying out, in part or in whole, the recommendations of the 1926 report. The commission has already adopted a general policy of pushing the local New Jersey improvements first. The 1926 report suggested a Manhattan loop originating in the Jersey meadows near the present Manhattan Transfer, and running by tube to Battery Place, in New York City, and thence uptown to 57th Street and thence crosstown and under the Hudson River to New Durham and back to the point of origin.

The report called also for a Paterson-Newark-Irving high-speed line. Included in the report were suggestions for other rapid transit routes serving the 240 municipalities in the North Jersey area. It was suggested that the Manhattan loop could be operated by the Interborough, or, failing that, by the Hudson & Manhattan Railroad.

Digitized by Google

LATE NEWS

(*Continued from Page* 130)

Rochester, N. Y. — The New York State Railways, Rochester Lines, has established a corps of uniformed motorcycle officers to patrol its lines and terminals. The object is to prevent boys from stealing rides on the rear of street cars and buses, to guard company property from vandalism and to protect patrons in stations on the outskirts, particularly at night. The men assigned to this work will be equipped with high-speed cars. The city police are co-operating with the railways.

✦

Toronto, Ont.—Comptroller Robbins, secretary of the Toronto Street Railway Employees' Union, has announced that the 38 trainmen who lost employment when the Toronto Transportation Commission abandoned the Metropolitan Radial Railway had been absorbed into the Toronto system.

✦

Wilmington, N. C.—Formal application for the privilege of modifying and extending the operation of the bus service previously granted to the Tide Water Power Company on Market Street to Seventeenth Street, so that the service may be continued through the downtown section and back out to East Wilmington, via Grace and Front Streets, has been made to the city board of commissioners.

✦

Jersey Shore, Pa.—The Jersey Shore Street Railway has informed the City Council that it will surrender its franchise to operate in the city if action is taken to compel it to carry out changes in its tracks on that part of the line in Allegheny Street which is slated for improvement.

✦

New Orleans, La.—Trackless trolley cars must pay a vehicle tax and drivers must carry chauffeurs' licenses, according to an opinion handed down by Attorney General Percy Saint in reply to the request for an opinion made by D. H. Clark, chief enforcement officer of the Louisiana highway police. The opinion was requested on the operation of the new trackless trolley by the New Orleans Public Service, Inc. The ruling apparently hinges on whether the vehicle operates on self-contained power. Attorney General Saint ruled that it did.

✦

San Francisco, Cal.—Investigation of the depreciation fund of the Municipal Railway and a comparison with the similar fund of the Market Street Railway is to be undertaken by the public utilities committee of the Board of Supervisors. A request of the Market Street Railway for an increase in the car-hour charge for power furnished the Municipal lines on lower Marker Street has been referred to the Board of Public Works.

✦

Pontiac, Mich.—No immediate action is planned by the City Commission on a request of the Eastern Michigan Railways for permission to charge an 8-cent fare rather than the present 7-cent city fare in Pontiac.

Philadelphia, Pa.—Stockholders of the Philadelphia Rapid Transit Company have elected Alexander Knox and Boyd Garbutt directors to succeed J. McCartney and N. H. Pettit. These two men, together with J. J. Haungs, constitute the employees' representatives on the board. Other directors were re-elected. The stockholders also approved a management fee of 2 per cent of Philadelphia Rapid Transit gross earnings to Mitten Management.

✦

Seattle, Wash.—An appropriation for double-tracking the Municipal Street Railway line on Eighth Avenue South, estimated to cost $37,452, asked of the City Council by Superintendent of Public Utilities Avery, has been taken under advisement by the Council utilities committee, pending a study of the whole improvement program and the financing plans involved.

✦

Michigan City, Ind.—Officials of the Chicago, South Shore & South Bend Railroad have filed papers with the secretary of state, certifying to a change in the number of directors to thirteen and to an increase in the capital stock by 10,000 shares of preferred having no par value.

✦

Trenton, N. J.—The Senate has passed a bill which would appropriate $375,000 from toll revenue as New Jersey's share in the construction of rails over the Camden-Philadelphia bridge. The measure now goes to the House of Assembly. Pennsylvania is also to contribute $375,000. Senator Richards pointed out that the original bond act for the construction of the span specifically designated that all revenues collected aside from maintenance and operation costs should be applied to retirement of the bonds. Senator Stewart and Senator Powell declared that the Bridge Commission intended to lay rails and that the action had only been deferred. Presumably both Philadelphia Rapid Transit and Public Service Coordinated Transport would be in a position to operate cars over the structure.

✦

Colorado Springs, Col.—The Myron Stratton Home Corporation, owners of the Colorado Springs & Interurban Railway, in its financial report for 1929, shows that the tramway was operated at a loss of $64,631. The company is substituting buses on some lines, and keeping the overhead at a minimum, hopeful that service will not have to be curtailed materially.

✦

Trenton, N. J.—Wage contracts for a three-year period have been entered into by the Trenton Transit Company and its employees. The present wage scale is to endure for three years. Platform men receive 61 cents an hour for the first three months and 63 cents hourly for the next nine months. After the initial year of service the rate becomes 65 cents an hour. Power house and other employees are also paid on a sliding scale.

✦

Oakland, Cal.—Alfred J. Lundberg, president of Key System Transit Company, and vice-chairman of the readjustment committee, announced on March 22 that subscriptions to new preferred stock under the company's reorganization plan to date total $3,682,875, or $182,875 more than necessary to insure payment of first mortgage bondholders. Deposits of first mortgage bonds now are more than 98 per cent of total outstanding; general and refunding more than 95 per cent; collateral trust notes more than 76 per cent; prior preferred stock more than 66 per cent; preferred stock more than 52 per cent, and common less than 1 per cent.

✦

Binghamton, N. Y.—A contest is being conducted by the Triple Cities Traction Company at the Binghamton Central High School for verses for car cards. For some time now, cards have been run in cars, the size of the regular advertising cards but placed in a rack—furnished by Collier—at the end of the car on the signal box. In the past the company has made its own copy, emphasizing safety, comfort, convenience, etc., but about the first of the year the company put in a four-line bit of poetry signed by a patron. That started something. Copy began to come in so that now the message is being changed every week and the poetry contest started.

✦

New York, N. Y.—On April 3, beginning at 10:30 a.m., the Department of Plants and Structures will offer for sale at public auction at the office of the department, Room 1800, Municipal Building, Borough of Manhattan, old structural steel trolley plates, gratings, columns, girders, steel trolley poles, rails, copper trolley wire, etc., now stored at the various locations mentioned in the advertisement and under the terms and conditions set forth in the *City Record*. This equipment was part of the property of the Manhattan Bridge Three-Cent Line, now no longer operated but replaced with a bus route.

✦

Philadelphia, Pa. — An ordinance to permit the Philadelphia Rapid Transit Company to operate the South Broad Street subway on its completion, April 20, has been sent to the Council by Mayor Mackey. The ordinance also authorizes the Mayor to negotiate a new lease with P.R.T. for operation of the entire Broad Street subway, subject to approval by the Council. The P.R.T. is at present operating the Broad Street subway under a "gentlemen's agreement," under which it is retaining all of the subway receipts pending a permanent agreement. On negotiation of the latter its provisions as to rental will be retroactive to the date of the "gentlemen's agreement," effective, Dec. 1, 1928.

News Flashes for the Industry

To supplement the service of the regular monthly issues of ELECTRIC RAILWAY JOURNAL, a separate NEWS service appears on 39 Saturdays during the year. This supplement keeps you in touch with fare increases, court decisions, association meetings, financial and corporate news, equipment purchases, changes in personnel.

Read the

Electric Railway Journal

NEWS!

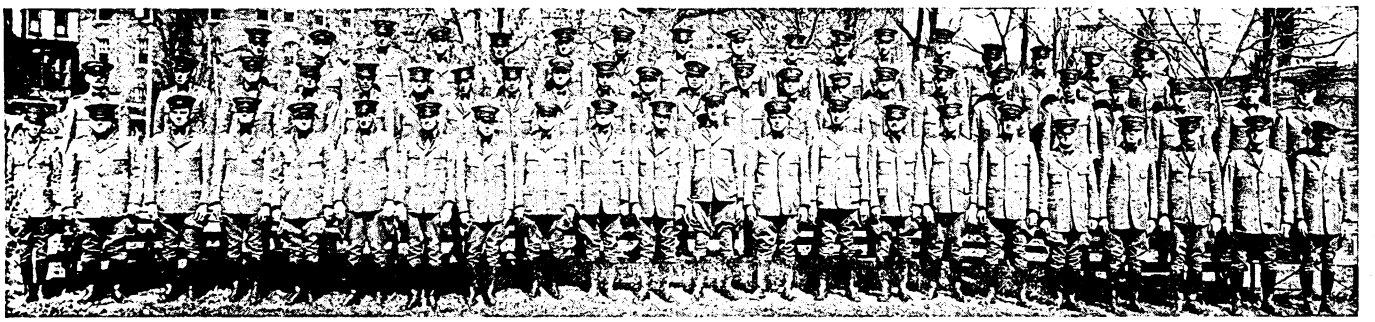
Digitized by Google

Roanoke's Circulating Sales Manager

Since August, 1929, the Roanoke Railway & Electric Company has employed a sales manager and public relations man whose labors are both diversified and unusual.

One of his primary jobs is to ride the cars and buses to observe the operating habits of the men, the appearance of the vehicle and the attitude of the patrons. In this respect, his work is not unusual, but his ways of correcting any difficulties found are out of the ordinary.

Instead of passing on his findings for action by C. B. Short the general manager, the sales manager is authorized to try personal instruction or persuasion first. As an expert in equipment, he discusses and demonstrates correct starting and stopping with the man at fault, and emphasizes what correct handling of equipment means in the easier sale of the ride. Uneven starting, overmuch running in second, and rough and excessive braking are all shown to be avoidable.



Meticulously Garbed Men Who Sell the Service in Roanoke

All this is handled in good humor, and not even the superintendent of transportation would be notified unless indifference should be shown after several attempts to cure.

In like manner, equipment annoyances like soiled ceilings or shabby upholstery are passed on to the shop superintendent for correction.

In discussing the work of this official, Mr. Short said that success of the job depended almost entirely on starting with the right type of man. The Roanoke man is a native of the city who started as a policeman, then made good as a plain clothes man, was an automobile salesman for eight years, then changed to the jobs of Pullman conductor and dining-car steward in turn. Here is a man who knows how to cater to the whims of the public, and to deal with the infirmities of operating men and transportation equipment. It took some time to find the right combination, but the results indicate that there is a market for the ride salesman.

A Cordial Welcome to the Pacific Coast

Routine matters were the principal subject of discussion at a meeting of the executive committee of the American Electric Railway Association held in New York on March 21. Reports of various committees and of the managing director and the general secretary were presented. Plans for the 49th annual convention were considered and a vote of thanks tendered to Labert St. Clair for his work in preparing an attractive booklet in conjunction with the committee on transportation. Recent legislative developments in Washington were outlined by Leslie Vickers. Changes in the method of selecting winners in the Brady Safety Award Contest were announced. In behalf of the California Electric Railway Association, G. J. Kuhrts, president Los Angeles Railway, assured those present a cordial welcome on the Pacific coast next June.

Jurisdiction of Court in Louisville Fare Case Upheld

The United States Court of Appeals at Cincinnati, Ohio, on March 22 upheld the decision of the Western Kentucky District Federal Court, at Louisville, Charles I. Dawson, judge, in the 10-cent cash fare case of the Louisville Railway against the city of Louisville. The decision at Cincinnati affirmed jurisdiction of the United States District Court at Louisville, the city having contended that the federal court had no jurisdiction in the matter. A constitutional question was involved, and the company had endeavored to show that enforcement of a 7-cent fare would be confiscatory and in violation of the fourteenth amendment.

The decision will probably mean further trial in the local federal court on the merits of the case, as the matter of jurisdiction has been settled.

The district court in Louisville formally granted a temporary injunction to the railway last fall, preventing the city from interfering with the company in the matter of collecting a higher rate of fare. The city then went to the appellate court for a ruling on jurisdiction.

Decree of Foreclosure Entered Against New York State Railways

Foreclosure of mortgages covering the property of the New York State Railways, ordered by Federal Judge Bryant upon application of owners of mortgage bonds on which interest is in default, will become effective April 1.

Benjamin E. Tilton and Wallace E. Pierce, receivers, will continue in that capacity during the foreclosure, which Judge Bryant authorized on March 25 on application of the Security Trust Company, Rochester. The trust company is acting as trustee for owners of $16,457,000 in consolidated mortgage bonds on which interest was defaulted on Feb. 1 and $1,500,000 in other bonds. Judge Bryant also ordered a complete audit and survey to be made of the railways' property.

Indiana Merger Arguments Concluded

Arguments in the proposed $70,000,000 merger of Insull-controlled utilities in Indiana were concluded on March 21 before the Public Service Commission. The hearings were resumed on March 17, after a recess of nearly three months. Attorneys for the petitioning companies were given until April 5 to file a brief, and counsel representing objectors fifteen days after that. The commission will then take action on the petition of opposing attorneys for dismissal of the case on grounds that merger of gas, electric, water, ice and transportation utilities is unlawful and that the commission has no jurisdiction in the matter.

Wage Scale Renewed in Memphis

Trainmen of the Memphis Street Railway, Memphis, Tenn., have agreed to the renewal of the present wage scale for another year. In a letter addressed to E. W. Ford, vice-president of the railway, the operators said:

"We are not at this time agreeing to the present wage scale because we feel it is just or fair, but we are doing so as a matter of patriotic duty with the hope that at the expiration of twelve months, officials of the railway will be glad to show the same consideration towards our membership and agree to an increase commensurate with the cost of living, standard of living, services performed, and conditions under which the services are performed."

Selling Tickets from House to House in El Paso

An interesting experiment is now being made by the El Paso Electric Company, El Paso, Tex., in house-to-house selling of street car rides. F. L. Grissom has been selected as the operator-salesman and has been calling upon residents in Kern Place. Results of the experiment are encouraging but they do not cover a period long enough to make them conclusive. The outlook is promising, however, and should ticket sales warrant it, the plan will be extended to other sections.

Full- and half-fare tickets are sold in strips in any amount desired and the customer may buy for cash or on credit. The primary object is to sell full-fare tickets sufficient to permit two rides a day for a 30-day period. All sales are made at the regular rate of fare, but the opportunity to have these charged on the regular bill for electric service is an advantage that appeals to many patrons.

Digitized by Google

Through Limited Bus Service Suggested for Akron

The Northern Ohio Power & Light Company, Akron, Ohio, has submitted a suggestion to the Akron City Council that an experiment be made on the West Exchange Street bus lines looking toward a through limited service in an effort to speed up service.

In general, the plan is to provide limited service on the long-haul lines; i.e., after a bus makes the last regular stop in the downtown business area it will proceed to a certain outlying point without any intermediate stops. The intermediate section between the business area and the outlying point which will be the first stop of the limited bus is to be served by local buses making all stops. This system will give the long-haul passengers faster service without undue sacrifice on the part of the close-in riders. The company realizes that to deprive close-in riders of frequent headway will discourage short-haul riders, but it also realizes that to encourage long-haul riders it must make the service more attractive by getting riders to their destination in less time than is now required.

The suggestion is also based on the theory that most of the company's bus routes were established to render service to outlying territories which had no other transportation service and it was never intended that these bus routes should supplement or rather compete with the already established rail service. The attitude of the company is that when two or more lines are operated on the same street or on parallel streets through necessity on account of routing, the bus routes serving outlying districts should not be required to serve the intermediate territory also in competition with routes already established and capable of rendering adequate and sufficient service within the intermediate territory.

Wants Columbus Railway to Be Self-Sustaining

A reduction in electric current rates in Columbus, Ohio, hinges entirely on the allowance of an increase in car fare to 8 cents cash, five tickets for 35 cents, according to Benjamin W. Marr, president and general manager of the Columbus Railway, Power & Light Company. The City Council has asked that the company promise to reduce power rates when the higher fares become effective. Mr. Marr believes it will be possible to reduce power rates by fall.

Some time ago Mr. Marr announced that the fare will be increased, effective on April 5. Immediately, the City Council directed City Attorney Davies to block the proposed increase by injunction. The issue is complicated by the fact that the company is operating without a franchise. The position of the council is that no change in fares will be countenanced unless the company obligates itself to serve the city over a period of years. The present fare is 6 cents cash and five tickets for 25 cents.

Wage Scale Renewed on New York State Lines

The New York State Railways and its employees in Rochester, Utica and Syracuse have reached an agreement on a wage and working contract for the coming year. At simultaneous meetings held in the three cities, the members of the Amalgamated Association voted to continue the present contract for the period of the receivership.

Benjamin E. Tilton and Wallace Pierce, appointed by Federal Judge Frederick H. Bryant as receivers of the railways in January, conducted the negotiations for the company.

The present wage scale calls for payment of 55 cents an hour for platform men on city two-man cars; 57 cents for interurban employees and 60 cents for one-man car operators.

It was provided that should the receivership be terminated within a year the contract will be carried over to April 1, 1931.

In other years negotiations have been prolonged and usually the contract was signed in May or June and made retroactive to April 1.

Wage Proposal Rejected in Oregon

Employees of the Pacific Northwest Public Service Company, Portland (formerly Portland Electric Power Company), have rejected the company's offer to split 50-50 with them any increase in gross revenues over the revenues of the year 1928 accruing to the company in the year 1930, as a result of the increase in fare recently made effective. Nearly a year ago members of the Amalgamated Association sought an increase of about 10 cents an hour for platform men and like increases for shop and track men, but the management stated that while it could not consider increasing wages under then existing conditions it would negotiate the question as soon as it might be granted an increase in fare, then pending before the Public Service Commission.

The present offer was rejected because it did not provide for any definite amount of relief. The management insists that it is too soon yet to estimate accurately the effect of the fare increase, but is willing to adopt this revenue-sharing plan as an expedient for the current year in lieu of a definite wage increase.

If an agreement is not reached by negotiation, the case will be arbitrated in accordance with existing arrangement.

Proposal for City Operation in Springfield, Ohio, Rejected

The City Commission, Springfield, Ohio, has denied the request of the Cincinnati & Lake Erie Railroad to take over and operate the Springfield Street Railway. The Commission held that the company's proposal was impractical. After turning down the company's proposal to operate the local service, the commission ordered it to cease and desist from operating freight trains through the city. Following action of the Commission in ending negotiations with the Cincinnati & Lake Erie company, the city began advertising for bids for a local transportation system which may include bus, electric lines or a combination of both. The bids will close on April 4.

Conspectus of Indexes for March, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares* 1913 = 4.84	Mar., 1930 **7.94**	Feb., 1930 **7.87**	Mar., 1929 **7.75**	Mar., 1930 **7.94**	Mar., 1925 **7.26**
Electric Railway Materials* 1913 = 100	Mar., 1930 **141.6**	Feb., 1930 **142.9**	Mar., 1929 **144.8**	Dec., 1926 **159.2**	Feb., 1928 **139.5**
Electric Railway Wages* 1913 = 100	Mar., 1930 **231.7**	Feb., 1930 **231.7**	Mar., 1929 **230.1**	Feb., 1930 **231.7**	Mar., 1925 **221.5**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	Mar., 1930 **203.0**	Feb., 1930 **203.6**	Mar., 1929 **203.4**	Nov., 1928 **205.7**	July, 1929 **199.0**
General Construction Cost Eng'g News-Record 1913 = 100	Mar., 1930 **206.8**	Feb., 1930 **206.5**	Mar., 1929 **207.8**	Jan., 1927 **211.5**	Nov., 1927 **202.0**
Wholesale Commodities U. S. Bur. Labor Stat. 1926 = 100	Feb., 1930 **92.1**	Jan., 1930 **93.4**	Feb., 1929 **96.7**	Nov., 1925 **104.5**	Feb., 1930 **92.1**
Wholesale Commodities Bradstreet 1913 = 9.21	Mar., 1930 **11.22**	Feb., 1930 **11.51**	Mar., 1929 **13.00**	Dec., 1925 **14.41**	Mar., 1930 **11.22**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	Feb., 1930 **153.0**	Jan., 1930 **155.4**	Feb., 1929 **154.4**	Nov., 1925 **167.1**	April, 1925 **150.8**
Cost of Living Nat. Ind. Conf. Board 1914 = 100	Feb., 1930 **158.8**	Jan., 1930 **160.4**	Feb., 1929 **161.0**	Nov., 1925 **171.8**	Feb., 1930 **158.8**
Industrial Activity Elec. World, kw.-hr. 1923-25 = 100	Feb., 1930 **123.5**	Jan., 1930 **121.8**	Feb., 1929 **140.4**	Feb., 1929 **140.4**	Aug., 1925 **94.3**
Bank Clearings Outside N. Y. City 1926 = 100	Feb., 1930 **96.5**	Jan., 1930 **95.2**	Feb., 1929 **110.1**	Oct., 1929 **111.8**	Nov., 1926 **94.0**
Business Failures Number	Feb., 1930 2150	Jan., 1930 2368	Feb., 1929 1737	July, 1929 1581	Sept., 1928 1348
Liabilities, Millions of Dollars	**69.13**	**78.55**	**62.15**	**102.09**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Digitized by Google

Militant Policy Helps Indiana Interurban

During the first two months of 1930, the Indianapolis & Southeastern Railroad carried 15 per cent more passengers than in the corresponding period last year. Important improvements in service effected since the reorganization of the line in August, 1928, are largely accountable for this steady increase in patronage.

Within the last eighteen months, thirteen new one-man parlor type cars have been purchased and all passenger service on the railroad is now operated with this new and modern equipment. A bus connection from Greensburg, serving Batesville, Sunman, Manchester, Aurora, Lawrenceburg and Cincinnati, was put into effect a little more than a year ago and five round-trips daily are made on this line.

For the better handling of freight an additional freight motor car was equipped in 1929; twelve freight trailers were constructed in the company's shop and new stock pens were erected at Arlington for the shipment of live stock.

The main high-tension line has been rebuilt for more than 75 per cent of the entire distance and the trolley wire has been rehabilitated and reinforced. It is expected that by May 1 the entire overhead structure will have been gone over and put in first-class condition.

Where the old company gave approximately two-hour service, the new company is giving hourly service on both the Connersville and Greensburg divisions, and on the Greensburg division half-hour service in the forenoon and evening rush hours. A truck connection out of Greensburg has been established to give direct overnight service to Osgood, Versailles, New Point and Batesville.

On Sundays, a rate of one-way fare plus 10 cents for the round-trip, is in force. On Jan. 1 the company began giving patrons, after 4 p.m., from any agency station on the line to any other station, the privilege of buying a round-trip ticket for the regular one-way fare, good after 4 p.m. and returning the same evening.

Several months ago all live stock rates were materially reduced.

Once Overs

By C. D. Batchelor

New York Evening Post.

Snapshooting the Millennium

"Madam, we are happy to welcome you as a patroness of our service. Just take your time, we are but your humble servants."

Pertinent Papers Read at Illinois Meeting

Of the four addresses delivered at the annual convention of the Illinois Electric Railway Association at Springfield, March 19, one dealt with the trolley bus, one with increasing interurban passenger revenue by reducing fares and one with Chicago's front entrance, center exit car. At an election of officers, Guy A. Richardson, Chicago Surface Lines, was elevated from vice-president to president, succeeding C. H. Jones, Chicago, South Shore & South Bend Railroad, Michigan City, Ind. R. B. MacDonald, Moline, Tri-City Railway, was made first vice-president and H. A. Johnson, Chicago Rapid Transit Company, second vice-president. George W. Schwaner, Springfield, was re-elected secretary-treasurer not only of the Electric Railway Association but also of the Illinois State Electric Association and the Illinois Gas Association which held their annual conventions in conjunction with the railway meeting.

F. G. Hamilton, Gary, Ind., of the Gary Railway, recited incidents where his company has made a large reduction in fares to increase passenger revenue. Among other things he said:

Revenue dropped from $4,136 per month in 1924 to $1,767 per month during the first six months of 1928. It was at this point that it was decided to try a severe rate reduction in an attempt to retrieve the diminishing business. Nine cents, or 37.5 per cent, was sliced off the one-way fare between Gary and Indiana Harbor, rates being reduced from 24 cents to 15 cents.

As a result traffic increased by leaps and bounds during the next few months. Whereas the average number of passengers carried per month during the six months previous was only 8,000, the average for the six months following the reduction jumped to 15,000. Average monthly revenue for the six months previous to July, 1928, was only $1,767, but following the 37.5 per cent fare reduction average monthly revenue increased to $1,986. The average monthly revenue for 1929 was $2,636, which compares with $4,136 in 1924, the best year, and $1,876 in 1928, the poorest revenue year.

The one-way fare between Crown Point and Gary was reduced from 45 cents to 30 cents, a decrease of 33.3 per cent. Similar reductions averaging 39.6 per cent were put in effect to intermediate points. At the same time the improved road bed and the speedier equipment permitted a reduction of five minutes in running time between Gary and Crown Point. The old cars made the trip in 55 minutes, whereas the new cars made the trip in 50.

Figures on revenue are not so encouraging as the figures on passenger traffic. Still, they seem to indicate that the new cars and low rates have arrested the decline of the past four years. The monthly average of $3,077 for 1929 is $50 under the monthly average for 1928. The average monthly revenue for the three months of 1929 previous to the change is $3,075, while for the eight months following it is $3,079.

W. C. Wheeler, engineer of equipment, Chicago Surface Lines, asserted in his address on "Chicago's Front Entrance, Center Exit Car," that "for congested city traffic where riding habit is such that interchange is frequent, it is possible to separate the entrance and exit too far, causing confusion by the people who must work through in a short distance. It is thought that this condition will remedy itself to a certain extent as the passengers become more accustomed to the cars," he said.

John B. O'Connell, assistant superintendent of transportation, Chicago Surface Lines, quoted from a table showing that the rides on public transportation systems in New York, with its population of more than 6,000,000, are more than five times per capita those of Lexington, with its population of 60,312. He said:

It is obvious that the popular usage of automobiles is greater in the smaller cities. These cities do not have the traffic problems of the larger ones and it is possible for the private automobile to serve its owner more easily. To attract riders the public transportation vehicle must offer a very attractive service and must, therefore, approach the desirable features of the passenger automobile. This task is not altogether impossible since the factors of economy and elimination of the inconvenience of terminal facilities necessary for private automobile usage are in favor of the public transportation vehicle.

After describing in detail the construction of the overhead system in his address on "Solving the Overhead and Collection Problems of Trackless Trolley," Lee Birch, engineer transportation department, Ohio Brass Company, said:

At the present time experiments are being conducted on a special device for making the swivel harp rigid at the will of the operator. Other experiments are being conducted on a "pull down" mechanism for lowering one trolley pole. Experiments are also being made on a ground shoe which will enable the coach to make negative contact with the street car rail. These three devices are being developed to permit a coach to operate with the positive wire and the track rail which is deemed necessary in some instances.

Chicago Co-ordination

Real progress is being made on Chicago's new transportation co-ordination ordinance, and the committee of bankers, heads of transportation companies and councilmen expected to fill in the missing financial sections by March 29, so that the ordinance can be submitted to the holders of the many different issues of securities embraced among the present outstanding obligations of the transportation companies. It is hoped that the Council will now pass the ordinance by April 15, and that the measure can be presented to the people at a special referendum on or about June 15. One of the most important steps recently taken toward this end came on March 20 when the local transportation committee of the Council adopted unanimously most of the recommendations on a financial set-up made by the committee of bankers, and allowed most of the points desired by the companies.

Digitized by Google

Eighteen Lines to Be Rerouted in Busy Brooklyn

During the next few weeks the Brooklyn & Queens Transit Corporation, Brooklyn, N. Y., will put into effect a plan for rerouting the various surface lines in the downtown Brooklyn area for the purpose of improving trolley operation and traffic movement.

To carry out the plan, decided in cooperation with the Brooklyn Borough President, the Police Commissioner, the Transit Commission and representatives of Brooklyn civic organizations, new curves, switches and special track work are being installed by the railway at a cost of approximately $100,000. The complete rerouting plan affects eighteen surface lines entering the downtown Brooklyn area and is designed to simplify the operation of surface cars by eliminating, wherever possible, crossings and left-hand turns.

The changes in surface car operation and traffic regulations are based on intensive study of the factors affecting the traffic situation in downtown Brooklyn in an effort to find some means of providing immediate relief for the existing congestion. In addition to spending $100,000 for changes in track layout, the Brooklyn & Queens Transit Corporation is purchasing 100 new cars, with modern equipment, such as to provide for rapid acceleration and retardation, at a cost of $1,600,000 to help speed up the movement of surface cars. All of the changes proposed are of an experimental character. The results of this experiment in the Borough Hall area will aid in the development of plans to improve trolley service and traffic movement in other sections.

Revere Beach Increase Authorized

The establishment of an exit fare in addition to the fare paid on boarding the train has been authorized by the Department of Public Utilities in permitting an increase between certain stations in the schedule of the Boston, Revere Beach & Lynn Railroad. The new schedule becomes effective May 4.

The company had filed a new schedule, in which it was proposed to increase the fare between stations in Lynn and stations in Boston and Winthrop from the present cash fare of 10 cents to 15 cents, providing, however, for the sale of twelve tickets for $1.50, thus establishing a 15-cent cash fare or a 12½-cent ticket fare.

The commission held that the proposed rates per mile of transportation are less than those charged by any railroad in the commonwealth. On this basis the commission held that the proposed rates were not unreasonable. The fare between Lynn and Revere is 10 cents. It is neither unreasonable nor unfair to require passengers riding from Lynn to Boston or Winthrop to pay an additional charge of 2½ cents, if tickets are used, or of 5 cents, if a cash fare is paid, for riding the extra distance from Revere to Boston or Winthrop. If by reason of the changed rates the company derives a revenue in excess of that necessary to maintain its credit, the commission directs that the excess be devoted to necessary repairs and to the improvement of the service.

Under the company's proposal, all persons leaving the stations at West Lynn and Lynn were to pay 5 cents, or present an exit coupon, in addition to the 10-cent cash fare already paid, and all persons entering those stations were to pay a 15-cent fare. Those passengers intending to leave the train within the 10-cent zone would obtain in the Lynn stations a redemption coupon entitling them to receive 5 cents at the station where they left the train. This plan the commission did not approve.

The commission also directed a change in the schedule to provide half-fare for students.

Disraeli Said:

"We all of us live too much in a circle. Nature is more powerful than education."

SEE NATURE—

DEVELOP YOUR EDUCATION

by

Attending the

49th A.E.R.A. Convention

at

San Francisco, Cal.

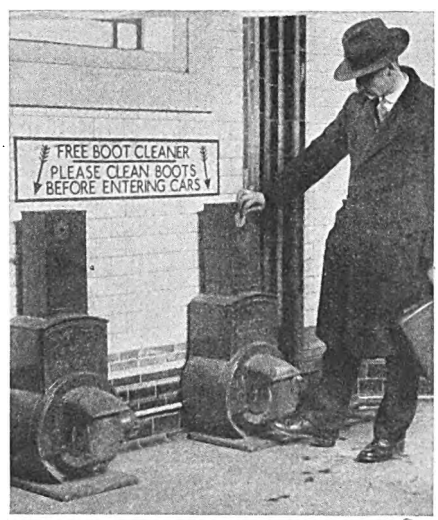
June 23 to 26 inclusive

THE GOLDEN WEST IN JUNE IS NATURE AT HER BEST

Free Shoe Shines for London Subway Passengers

Two automatic shoe-cleaning machines have been installed at Morden station, the south London suburban terminus of the Underground Railway, and passengers may now polish their shoes free of cost. If a traveller is not satisfied with the first operation of the brush, he may give repeat orders to the machine, and there is still no charge.

This innovation is due to the large quantities of mud which have been brought to the station and the railroad cars by laborers employed in the neighboring building estates in course of development. The machines have been placed between the ticket barrier and the platform. If the experiment proves successful the Underground may install similar machines at other London subway stations in areas where building estates are being developed or where many laborers patronize the subway.



Passenger's shoes are polished for nothing at this London station

New Omaha Rerouting Acclaimed

During the first week of the latest rerouting of the Omaha & Council Bluffs Street Railway, which went into effect on March 2, not one complaint was registered in contrast to the many received during the original rerouting, put into effect on Dec. 8.

Under the latest rerouting there has been a drop of 25 per cent in the number of transfers issued, compared to the first rerouting program, indicating that the desired result of taking the largest possible number of commuters directly from their homes to their work is being achieved.

The new system requires 114 "base cars" as against 108 on the first rerouting and 112 on the original system. The bus system, consisting of seventeen buses, has not been changed. It met with immediate approval.

The new routing was made easier by the fact that power from three new substations was available for the change. One more new power substation is now in the process of construction.

An effective good-will gesture on the part of the company was the running of page advertisements in the Omaha newspapers the evening of the first business day the new system was in effect, with large headlines which read "Thank You For Your Co-operation." Extracts from the advertisement read:

The people who were inconvenienced by **the rerouting seemed to** remember that we, **too, are** just human beings doing the best **we can.** It is therefore natural that our **relations** with our patrons be friendly. . . . **We want** to thank all the car riders for **their friendly** co-operation with us in making **the** routing changes. We are confident **that this** co-operation will continue. . . . **It will be** a few days before all the lines and schedules work smoothly. Time and **energy mean** nothing to us in bringing about this desired result.

Harvard Award to Westinghouse

The Harvard Award, for the "general or institutional advertising campaign conspicuous for the excellence of its planning and execution," established by the late Edward W. Bok, has been presented to the Westinghouse Electric & Manufacturing Company. It is the first made to a national institutional advertising campaign in newspapers since the founding of the event.

The award was established in 1923 in the belief that recognition of this kind would stimulate excellence in the planning and execution of advertising. It also would afford, the founder stated, an educational opportunity through the focussing of public attention upon advertising of excellence and provide a means to encourage advertising workers through public recognition of their work.

The Westinghouse advertisements consisted of a series of twenty announcements, nearly all of which were a full newspaper page in size. They appeared in the leading newspapers of the United States and for the most part were included in rotogravure sections.

The advertisements told, in simple terms, of the great service electricity is rendering today's world—in industry, in transportation, in home, in office. They were "institutionalized" by citing the important contributions made by Westinghouse in expanding the uses of electricity.

The series was part of a Westinghouse newspaper advertising campaign which had its inception in 1928.

Digitized by Google

PERSONAL MENTION

Guy A. Richardson Heads Illinois Association

Vice-President and General Manager of Chicago Surface Lines Honored by Election to Important Sectional Association Post

GUY A. RICHARDSON, vice-president and general manager of the Chicago Surface Lines, was elected president of the Illinois Electric Railway Association at the recent meeting of that body in Springfield. Thus another association activity is added by this executive, never too busy to render aid in the councils of the industry with which he has so long been identified. Few executives have larger responsibilities than he, yet he has always given freely of his time to work of this kind, more recently as a member of the policy and the membership committees of the American Electric

Guy A. Richardson

Railway Association and at present as second vice-president of that body.

Guy Richardson has had a wide experience in railway operation. He first attracted national attention by his work at Seattle, Wash., in which city he rose from the post of assistant superintendent of the Seattle Electric Company to superintendent, only to be drafted by the U. S. Shipping Board. But that is getting a little ahead of the story. For the sake of sequence it would perhaps be better to stick to the strictly chronological order.

Born in Boston, Mass., in 1882, Mr. Richardson secured his education in the public schools of that city and of Newton, Mass., and was graduated from the Mechanic Arts High School in 1900, later taking a postgraduate course in machine shop work and mechanical drafting. In 1901 he entered the service of the Boston Elevated Railway with the status of an apprentice and an understanding that his education was to include training in a number of the company's departments. In this capacity he worked in the shops, power stations and on the cars as motorman.

During the summer of 1903 he was transferred to the electrical engineering department and remained there until September, 1904, when he accepted a position with the Boston & Northern Street Railway as inspector of car repairs. In May, 1905, he went with Stone & Webster and was assigned to the Houghton County Traction Company, in the copper country of the Michigan peninsula, as assistant superintendent. On Nov. 1, 1906, he was promoted to the position of superintendent of the property.

Prior to Mr. Richardson's advent on the job at Houghton it was the custom for the line to be snow-bound for weeks at a time with little more than a perfunctory effort to keep it clear. Mr. Richardson interpreted it to be his job to keep the line open, which he succeeded in doing. And anyone who knows what the snows are in the Michigan copper country realizes the prodigious task that confronted Mr. Richardson.

In January, 1910, Mr. Richardson was transferred to Seattle, as assistant superintendent of transportation, and by the end of the year had been made superintendent of that department. In a hair-trigger situation as regards public relations, the new superintendent acquitted himself in a manner that won the respect of a hypercritical city administration and did much to restore the property to public esteem. During the war period Mr. Richardson was drafted by the shipping board to assist in layout out a transportation system to serve the Hog Island ship yard, near Philadelphia. Other work of a consulting capacity at about this period included surveys for the Brooklyn Rapid Transit Company and the Chicago Elevated Railways.

When the property of the Seattle Electric Company was acquired by the municipality, although he received flattering offers from the then Mayor of the city, Ole Hanson, to stay and run the job, Mr. Richardson chose to try his fortune elsewhere and accepted a position as superintendent of transportation with the Philadelphia Rapid Transit Company. With that company he rose rapidly to the position of vice-president in charge of transportation, but resigned in October, 1922, and shortly afterwards went with the Chicago Surface Lines, with which property, as stated before, he now fills the position of vice-president and general manager.

✦

Thomas A. McConnell, for seven years assistant manager of the Yellow Cab, Inc., Newark, N. J., has been appointed acting manager of the Yellow Cab Division of Public Service Co-ordinated Transport, operating electric railway and bus lines. Mr. McConnell and his staff will have their headquarters in Public Service Terminal, Newark.

W. A. Robertson in Fort Worth Post

W. A. Robertson, recently appointed general superintendent of the Northern Texas Traction Company, Fort Worth, Tex., has been connected with Stone & Webster properties since 1910. Before going to Fort Worth he was connected with the Jacksonville Traction Company for more than four years, having been made general superintendent of that Florida property in June, 1924.

Mr. Robertson was born in Gallatin, Tenn., in 1889. After completing his education in the schools of that state he moved to Houston, Tex. His first business connection was with the Southern Pacific Railroad in the stores department as general clerk and price clerk. He served in these capacities from January, 1909, to Aug. 1, 1910. On leaving the Southern Pacific Railroad he went to work for the Houston Electric Company in the accounting department, and has been connected with Stone & Webster properties since August, 1910. Mr. Robertson worked in various capacities for the Houston Electric Company until June, 1920, at which time he was transferred to the Galveston-Houston Electric Railway as superintendent of transportation of its interurban line between Houston and Galveston. On Jan. 1, 1921, he was made superintendent of railways of the Eastern

W. A. Robertson

Texas Electric Company, Beaumont, Tex.

As stated previously he was transferred to Jacksonville, Fla., in June, 1924, as general superintendent of the Jacksonville Traction Company and from that company after more than four years he was transferred to Fort Worth, Tex., where his work has to do with a system of about 200 miles of railway.

✦

D. E. Watson Heads Terre-Haute-Indianapolis System

David E. Watson, Indianapolis, was elected president of the Terre Haute, Indianapolis & Eastern Traction Company at a special meeting of the board of directors. He takes the place left vacant by the death of Robert I. Todd. Mr. Watson assumed his new duties immediately. He has been general attorney for the company for some years and has had charge of all legal matters connected with the merger now under consideration. He will continue to supervise the company's legal business. L. T. Hixson was re-elected vice-president of the company.

Digitized by Google

Peter Witt in New Cleveland Post

Accepts Five-Year Contract as Consultant to Van Sweringens, Now Engaged in Co-ordinating Street Railway and Rapid Transit Services

PETER WITT, street railway consultant and former street railway commissioner at Cleveland, Ohio, has accepted a five-year contract as consultant for Metropolitan Utilities, Inc., the Van Sweringen company which controls the Cleveland Railway under a voting trust arrangement, and also controls the Cleveland Interurban Railway, the Van Sweringens' Shaker Heights rapid transit lines, and Rapid Transit, Inc., the company which will control other Van Sweringen rapid transit lines radiating along railroad rights-of-way from the new Cleveland union terminal.

The contract was negotiated by George

Peter Witt

D. McGwinn, vice-president of the Cleveland Union Terminals Company. On two occasions in the past few weeks, Mr. Witt declined the job of consultant, but he was finally persuaded to accept the post because he felt he would have an opportunity to assist in the creation of the co-ordinated transportation system in Greater Cleveland. Mr. Witt said:

"I was informed by Mr. McGwinn that the people back of him are going to do everything possible to give the car riders what they are entitled to. Since they approached it in that light, I concluded it was a real opportunity. I will consult with Metropolitan Utilities officials, and also offer my own proposals."

Mr. Witt was railway commissioner of Cleveland from 1912 to 1916 during the regime of former Mayor Newton D. Baker. After leaving the commissioner's office, Mr. Witt took up consulting work, giving advice on railway problems in Seattle, Boston, Philadelphia, Toronto and other cities. He also developed the Peter Witt type of street car.

During the period from 1924 to 1928 Mr. Witt was a member of the Cleveland City Council, which, under the Tayler grant, has sole authority over railway operations. The Republican-Democratic coalition which controlled the Council declined, however, to heed Mr. Witt's proposals on railway matters. Oddly enough, one of the reasons Mr. Witt ran for the Council was to try and block the union terminal project. He was one of the original proponents of the plan to have the union station built on the lake front.

The fact that Mr. Witt is to advise the Van Sweringens not only on the co-ordination of rapid transit and street railway services, but also on the operations of the Cleveland Railway, is regarded as an indication that the Van Sweringens are of the opinion that the Tayler grant is no longer an effective plan for operations, so far as placing control of operations in the hands of the city is concerned.

As he started on his new job, Mr. Witt pointed out that the entire Cleveland Railway system is now carrying no more passengers than it did in 1914. He quoted figures and then added:

"These figures show that the remedy thus far applied, increasing the rate of fare, is worse than the disease. If the potential car rider is to be captured the rate of fare for the man who rides 8 blocks must be made considerably less than for one who rides 8 miles."

Peter Witt is acknowledged to be one of Cleveland's most picturesque public figures. At 60, his hair is black, with hardly a trace of gray. His figure is slender and tall, and his manner is bitter and sarcastic in public criticism from the platform, but mild and benign in private. He began life as a molder, single taxer and a Socialist street corner orator and was won over by Tom Johnson (whom he had been attacking). He was a tax expert and city clerk under Johnson; as mentioned previously, under Mayor Newton D. Baker he was railway commissioner.

✦

L. B. Herrington Heads Lexington Company

Announcement was made on March 22 at Lexington, Ky., by J. P. Pope, vice-president of the Lexington Utilities Company, owner of the Kentucky Traction & Terminal Company, that L. B. Herrington, president of the Kentucky Utilities Company, Louisville, had been elected president of the company, controlled by the Kentucky Securities Corporation, which was recently bought by Middle West Utilities Company from International. Included in the Lexington Utilities Company is the Consolidated Coach Corporation.

The Lexington Utilities Company operates the railway, power and other services in Lexington and through its subsidiary, the Kentucky Traction & Terminal, the interurban lines to Frankfort, Paris and other points.

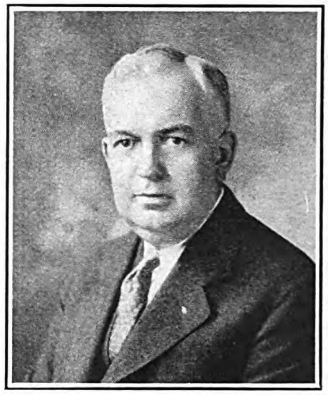
Mr. Herrington succeeds P. M. Chandler, New York, as president. Martin and Samuel Insull, G. T. Bogard and A. A. Tuttle, Louisville, are new members of the board of Lexington Utilities. Mr. Pope and Thomas A. Combs, of Lexington, are hold-over members. Mr. Chandler, F. W. Bacon, R. P. Buell, New York; H. A. Loeb and H. P. Clark, Philadelphia, have retired from the board. Mr. Bogard of Kentucky Utilities becomes vice-president; Mr. Tuttle, treasurer; G. C. Jones, secretary treasurer; Miss Ollie B. Pherigo and L. W. Haley are to be assistant treasurers.

T. H. Steffens Heads Oklahoma Association

At the Oklahoma Utilities Association convention, held in Tulsa, March 11, 12 and 13, T. H. Steffens, president of the Sand Springs Railway, was elected president of the association. Prior to this he served as vice-president of the state utility body.

In addition to being president of the Sand Springs Railway Mr. Steffens is a director in a number of industrial enterprises. He is deeply interested in civic affairs and is a member of the Rotary, Optimist, Tulsa Traffic and Tulsa Athletic clubs. Tulsa Chamber of Commerce, vice-president of the Tulsa State Fair, and is a Shriner and a trustee of the Sand Springs Home.

Mr. Steffens was born in St. Louis, Mo., on March 1, 1883. There he was educated and there he entered the service of the Frisco Railway in 1900, where he was employed until May, 1911. He then became associated with the late Charles Page and went to Oklahoma in connection with the



T. H. Steffens

building and operating of the Sand Springs Railway, between Sand Springs and Tulsa. This property has grown from a 7-mile single track to a double-track line with an industrial trackage of 30 miles serving approximately 80 industries and distributing houses. The line was constructed in a virgin territory with no outstanding industries.

✦

Henry B. Wood Assumes Broader Duties

Henry Blake Wood has been appointed chief electrical engineer of the Stone & Webster Engineering Corporation, Boston, Mass. Mr. Wood was graduated in 1896 from the electrical engineering course at Purdue University. After four years in the testing and switchboard engineering departments at the Schenectady works of the General Electric Company he was assigned to the Boston office of that company in switchboard sales and engineering activities.

In 1917 Mr. Wood entered the Stone & Webster Engineering Corporation's organization as engineer in the electrical division, and in the summer of 1926 was made assistant to the chief electrical engineer. His work has embraced a wide variety of public utility and industrial undertakings, including a hydro-electric investigation in Japan in 1928 and numerous engineering jobs in continental United States.

Digitized by Google

New Officers for Reorganized Indiana Road

Raymond R. Smith, formerly vice-president and general manager of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railways, later receiver for the two lines, has been elected president of the new Northern Indiana Railway, Inc., which will take over these properties.

Mr. Smith, as receiver for the lines, conveyed the title to the new company and this marked practically the end of the period of involved legal technicalities which have been in progress for months.

In accordance with a policy of placing the lines as far as possible under local control, three other South Bend men were elected to important posts.

George R. Green, general superintendent of the lines as formerly organized, was made general manager of the new company.

Harry Weir, local attorney, was made vice-president and general counsel.

Oren A. Small, former secretary of the old lines, was made secretary and treasurer under the reorganization plan.

Alfred E. Dieterich, New York City, whose father, the late C. F. Dieterich, was president of the lines as formerly constituted, was elected chairman of the board of directors.

Mr. Smith, in addition to being president, was chosen chairman of the executive committee.

No change in the rest of the official personnel of the lines is contemplated.

The new directors are as follows: A. E. Dieterich, New York City, chairman of the board; R. R. Smith, South Bend, Ind.; Amos H. Plumb, Emporia, Kan.; Alva L. Kitselman, Muncie, Ind.; Harry R. Wair, South Bend, Ind.; William Carnegie Ewen, New York City, and one vacancy to be filled later.

The executive committee is to be R. R. Smith, chairman, and Alva L. Kitselman and Harry R. Wair.

The terms of the reorganization of the company were made the subject of a detailed study in the ELECTRIC RAILWAY JOURNAL for March, 1930, page 168, at which time they were also the subject of editorial comment.

✦

C. L. Seavey Heads California Commission

Clyde L. Seavey was recently elected president of the California Railroad Commission for 1930, in conformity with the policy followed by the commission in recent years of rotating the presidency among its members for a one-year term.

Commissioner Seavey succeeds Commissioner Thomas S. Louttit as the presiding officer of the commission, who held that position during 1929. He has served on the commission since Jan. 1, 1923, having been reappointed by Governor C. C. Young on Jan. 1, 1929. He served as president of the commission in 1923 and 1924.

Prior to his appointment to the Railroad Commission President Seavey served as city manager of Sacramento. Before accepting that appointment, he had been connected with the state government for many years as member of the state board of examiners, state board of control, state tax commission, state civil service commission, as well as in other special capacities of importance. Mr. Seavey is a Republican. He was born at Dixon, Ill.

✦

H. R. Frederick, for the last two years assistant manager of the Steubenville, East Liverpool & Beaver Valley Traction Company, Steubenville, Ohio, which operates between Beaver, Pa., and Steubenville, has been named general manager. He succeeds C. A. Smith, who has been elected president. Mr. Frederick has been associated with the company for eight years. He was engineer in charge of maintenance of way for six years. Prior to that he was a civil engineer for the Pennsylvania Railroad.

A. Stuart Pratt Retires

A. Stuart Pratt, vice-president of the Stone & Webster Service Corporation, Boston, has resigned, following many years of executive responsibility in the management of utilities with which this house is associated. His long and distinguished service in the supervision of the power companies at Cape Breton, Lowell, Brockton and Abington, Mass., was recognized some years ago by his promotion to the vice-presidency of the centralized management organization at Boston. He now retires to be freed from some of the exactions of business life. He is one of the best-known and most highly regarded executives in the Stone & Webster organization.

✦

Morse DellPlain Honored for His Utility Leadership

Morse DellPlain

Morse DellPlain, Hammond, Ind., was honored at a testimonial banquet at the Union League Club in Chicago on March 15 in recognition of his leadership in public utilities. Mr. DellPlain is now president of the Northern Indiana Public Service Company, vice-president of the Midland United Company, vice-president of the Chicago, South Shore & South Bend Railroad, and president of the newly organized Calumet Railways, Inc., which proposes to rehabilitate the Hammond, Whiting and East Chicago railway lines.

Mr. DellPlain has rapidly made a name for himself in and about Chicago by his able handling of utility problems and the versatility he has displayed in the discharge of his duties, explained in part by the range of his previous experience. He was born in New Orleans, La., in September, 1880. Most of his early life was passed in the Republic of Mexico. From 1890 to 1896 he was employed by the Central & South American Telegraph Company as an operator on the Isthmus of Tehuantepec. He later took up the electrical engineering course at Syracuse University.

In 1903 to 1905 he was an apprentice in the shops of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., and worked for the company as sales engineer in the Syracuse, N. Y., office from 1905 to 1909. He became power engineer for the Syracuse Lighting Company in February, 1909, and on Jan. 1, 1918, was appointed sales manager for that company. This position he resigned to become vice-president and general manager of the Northern Indiana Gas & Electric Company, predecessor of the Northern Indiana Public Service Company at Hammond, Ind. Mr. DellPlain is a member of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers. He is also a member of the Illinois Athletic Club and the Collegiate Club of Chicago.

✦

Joe Brennan New Carhouse Superintendent at Cincinnati

Joe Brennan has stepped up another rung on the ladder of promotion with the Cincinnati Street Railway, Cincinnati, Ohio, which has taken him away from Eighth Street division. Joe is now superintendent of carhouses, succeeding the late Walter Lee Frazier. Mr. Brennan began his street railway experience with the company at Cincinnati as a hill boy in 1895. Two years later he became a mechanic in the Clifton-Elm carhouse and was promoted a few years later to the position of night foreman in that division. In 1901, he transferred to Brighton carhouse, taking the position of day foreman there. In 1905, he took the same position in the Avenue carhouse, and in 1921 he went to Eighth Street, where he served as foreman up to his present promotion.

✦

A. F. Townsend, manager of the Northern Texas Traction Company, the Northern Texas Electric Company and the Tarrant County Traction Company, Fort Worth, Tex., has been elected president of these three firms, replacing George H. Clifford, Boston, now president of the Stone & Webster Service Corporation. Mr. Townsend will continue as manager of the three Stone & Webster subsidiaries located at Fort Worth. Amatus A. Chamberlain, treasurer of the Northern Texas Traction Company and Tarrant County Traction Company, was named treasurer and assistant secretary of those companies. The Northern Texas Electric Company is the parent company of the Texas Motor Coaches, Northern Texas Traction Company and the Tarrant County Traction Company, the latter operating the Fort Worth-Cleburne interurban line.

Digitized by Google

C. D. Emmons Resigns as President at Baltimore

C. D. Emmons, for eleven years president of the United Railways & Electric Company, Baltimore, Md., resigned on March 26. His resignation was accepted after the board had passed resolutions expressing their appreciation of his service. Lucius S. Storrs, executive chairman, was elected to succeed him. Mr. Storrs will continue as chairman as well as discharging the duties of the president of the company. Mr. Emmons announced that he would establish an office as an engineering consultant in New York. It was indicated that he would specialize in public utilities. He planned to sail from New York on March 29 on the *Minnetonka* for a short visit in Europe.

✦

Mr. Maltbie to Finish Philadelphia Work

Appointment of Dr. Milo R. Maltbie as chairman of the New York Public Service Commission is not expected to interfere with completion of his work in connection with the audit of the Philadelphia Rapid Transit Company's books. Mr. Maltbie was selected as Comptroller Hadley's representative at a conference of experts before President Judge Harry S. McDevitt of the Common Pleas Court, where a reorganization of the relations between the city and the company is under consideration. Other experts are drawing up separate recommendations for the Mayor, the City Council and the company.

✦

"Bert" Sanders Leaves Kansas City Public Service

E. B. Sanders, for ten years in charge of the commercial department of the Kansas City Public Service Company, Kansas City, Mo., has resigned to open an advertising agency in Cleveland, Ohio, as representative of the Barron's Advertising Company. He is succeeded at Kansas City by A. H. Wood, son of B. F. Wood of Stevens & Wood, Inc., New York City. Mr. Wood has been a cadet engineer with the Public Service Corporation of New Jersey. Before that he was with Barron Collier, Inc., in New York. "Bert" Sanders, as he is familarly known, has long been connected with newspaper and advertising activities, his apprenticeship including intensive training under Henry J. Allen, former Governor of Kansas, known as one of the most expert mentors and appraisers of newspaper talent in the United States. The work of few men in the public relations field with utilities has attracted more favorable attention than has that done by Mr. Sanders.

✦

E. R. Norris has been appointed assistant to the vice-president according to an announcement issued by J. S. Tritle, vice-president in charge of manufacturing of the Westinghouse Electric & Manufacturing Company. Mr. Norris, formerly general works manager, will now be responsible for all plant facilities of the company, manufacturing methods, cost reduction and inspection. Mr. Norris has been associated with the Westinghouse company since 1892.

John B. O'Connell

John B. O'Connell in New Chicago Post

On March 1, John B. O'Connell became assistant superintendent of transportation for the Chicago Surface Lines, succeeding M. B. Quinn, who has been assigned to public speaking and trainmen instruction.

Mr. O'Connell was first employed by the Surface Lines in 1915 as a substation helper. During that time he was a student at the Armour Institute of Technology. He enlisted in the United States Navy in 1917 for the period of the war, serving as chief electrician. After leaving the navy, he worked for a short time as a journeyman electrician and then went to sea again as a licensed engineer officer, retiring from this service in 1920 when his ship, "Snug Harbor," was wrecked off Block Island.

He entered the University of Illinois and took a course in electrical engineering and electric railway engineering, graduating in 1923. Following a brief employment with the electrical department of the Pennsylvania Railroad and with the Public Service Company of Northern Illinois, he returned to the Chicago Surface Lines as a cadet engineer. After being connected with several departments, he was made division superintendent of North Avenue, the largest division of the Surface Lines, in 1927. Last April, he was appointed assistant to E. J. McIlraith, staff engineer, and served in that capacity until his appointment as assistant superintendent of transportation.

Mr. Quinn has been with the Surface Lines 43 years, serving in all capacities in the transportation department, including the posts of division superintendent and assistant superintendent of transportation. In recent years, he has been closely identified with the Speakers Bureau work and the training of trainmen, to which he now devotes all his time.

✦

Duties of A. P. Gale Widened

A. P. Gale, for nearly four years manager of the Beloit division of the Wisconsin Power & Light Company, with headquarters in Beloit, has been transferred to Fond du Lac, and promoted to the management of the entire eastern division of the organization. He will have charge of the districts of Sheboygan, Fond du Lac, Oshkosh and Clintonville, together with all the bus and railway systems operated by the company excepting the bus line at Janesville. He will be in charge of the $6,000,000 development program at Sheboygan. Mr. Gale will be succeeded as manager of the Beloit division by James G. Allen, who has been manager of the Lake Geneva division which has been consolidated with the Beloit division.

✦

J. W. Rich, general manager of the Mount Vernon, Alexandria & Washington Railway, Washington, D. C., has resigned, his resignation to take effect May 1, 1930. He has been connected with this property and its predecessor, the Washington-Virginia Railway, as division superintendent, general superintendent and general manager, for the past 22 years.

OBITUARY

E. F. Peck

E. F. Peck, long connected with the engineering and management firm of Peck, Shannahan & Cherry, and its predecessor, Allen & Peck, Inc., is dead. Mr. Peck had not been active in utility work since 1921 when he was run down by an automobile and injured, but he was active in that field, very active, for many years, the years of the formative stages of the industry, in which he played a conspicuous part.

To electric railway men, he is perhaps best known as a member of the firms previously mentioned, as an officer of the Schenectady Railway, and as an associate of John N. Shannahan in the work of rehabilitating the railway property at Hampton, Va. To men in the light and power field, he is perhaps best known as a pioneer Thomson-Houston man, an officer of the Citizen's Electric Illuminating Company, and the Kings County Electric Light & Power Company, Brooklyn, N. Y., now both included in the system of the Brooklyn Edison Company, Inc., and as an officer of the Schenectady Illuminating Company and the Mohawk Gas Company. Incidentally the credit is his indirectly for securing the financial co-operation of the late Charles A. Coffin in the Thomson-Houston Company, later succeeded by the General Electric Company.

Born in New Britain, Conn., in 1861, he entered the electrical field in 1880 with the American Electrical Company, New Britain, Conn. This company subsequently became the Thomson-Houston Company. Mr. Peck was one of the first electrical experts to be entrusted by this company to install its apparatus. Moreover, he was in charge of the Thomson-Houston Company's exhibit at the Franklin Institute Fair in 1884, the first exhibit devoted solely to electrical apparatus held in the United States. Afterward, he had charge of the exhibit of the same company at the World's Fair in New Orleans in 1884-1885. It was from the Thomson-Houston Company that Mr. Peck resigned in 1885 to become general manager of the Citizens' Electric Illuminating Company, Brooklyn, N. Y. He continued in this capacity until 1897,

Digitized by Google

when he entered the engineering and supply business in New York City under the firm name of the Peck Electrical Company.

In 1899 Mr. Peck was appointed general manager of the Kings County Electric Light & Power Company, Brooklyn, a position he held until 1902, when he was appointed general manager of the Schenectady Railway. As indicated before, at Schenectady he was an officer in both the Schenectady Illuminating Company and the Mohawk Gas Company in addition to being general manager of the railway, all being under General Electric control at that time. Later these companies passed to joint ownership by the New York Central Railroad, and the Delaware & Hudson Company, but Mr. Peck continued with them in active charge until 1912, when he resigned to devote his entire time to the interests of Allen & Peck, Inc. The following year, he was elected president of the Hagerstown & Frederick Railway, serving also at the same time and in after years as vice-president of the Newport News & Old Point Railway & Electric Company.

Among the cities in which Mr. Peck assisted in installing electric light plants in the early days of the industry are Boston, Fall River, Lynn and Haverhill, Mass., Columbus and Springfield, Ohio, St. Louis, Mo., and Brooklyn. His work for the Schenectady Railway also was conspicuous. Not only did he introduce many innovations in the operation of the local city lines, but he made the company's interurban between Schenectady and Albany one of the outstanding lines of its kind in the East.

When Peck, Shannahan & Cherry was organized, Mr. Peck brought to it just that leaven of matured judgment and experience needed to balance the work of the younger men, fired with enthusiasm for accomplishment in a field in which it is not by any means so easy to score an outstanding success. One of the offices which Mr. Peck filled outside the direct line of his managerial work was that of president of the New York Electric Railway Association in 1909-1910. He had long been a member of the American Institute of Electrical Engineers.

✦

Alexander L. Black

Alexander Leslie Black, a vice-president of Ford, Bacon & Davis, and a vice-president of the Market Street Railway, San Francisco, from 1916 to 1925, died at San Francisco on March 3 at the age of 60. Mr. Black had been vice-president of the New Orleans & Lake Ponchartrain Bridge Company. He joined the organization of Ford, Bacon & Davis, New York, N. Y., in 1912 as engineer in charge of their Southern properties. Mr. Black was born in New Orleans, La., in 1871. He attended private schools in New Orleans and New York and was graduated from the School of Mines, Columbia College, in 1890. He engaged in mining work in the West and Mexico for three years, and was employed for a few months as assistant engineer on the Topographical Survey of New Orleans. In 1894-1895 he had charge of the reconstruction for electric operation of the St. Charles Street Railroad, New Orleans, and remained with that company supervising operation and constructing extensions until 1901, when the New Orleans properties were consolidated. For a long while he was engineer for the New Orleans Railway & Light Company, controlling the New Orleans street railways and lighting properties.

✦

Peter Junkersfeld

Peter Junkersfeld, since 1922 a vice-president with the construction and engineering division of Stone & Webster, is dead. Starting from the humblest beginnings, a farm near Sadorus, Ill., he acquired his early education at the school in the vicinity of his home, and then entered the University of Illinois, from which institution he was graduated as Bachelor of Science.

In the fall of 1895 he established a connection which lasted for a period of 24 years, when he entered the employ of the Chicago Edison Company, now the Commonwealth Edison Company. From various capacities in power plant operation, he rose in the organization until in 1909 he became assistant vice-president, supervising contracting, engineering, construction and operating work.

After serving with distinction in the army during the World War he returned to the Commonwealth Edison Company, but only for a few months. In April, 1919, Stone & Webster engaged him as engineering manager in charge of the engineering department and as an executive of the division of construction and engineering. In February, 1922, he became a member of the firm of McClellan & Junkersfeld, Inc., engineers and constructors. Six years later his firm was merged with the division of construction and engineering of Stone & Webster and Mr. Junkersfeld became a vice-president.

✦

Joseph H. Bragdon

Joseph H. Bragdon, publishing director of *Textile World* and vice-president and general manager of the Bragdon, Lord & Nagle Company division of the McGraw-Hill Publishing Company, publishers of that paper, died suddenly of pneumonia on Feb. 19.

Mr. Bragdon was a member of the executive committee and of the board of directors of the McGraw-Hill Publishing Company. He was past president of the New York Business Publishers Association and a past president of the Associated Business Papers, the latter office being the highest honor which the business publishing profession can offer. At the time of his death he was a member of the board of governors of the Advertising Federation of America.

Mr. Bragdon was born in Melrose, Mass., on June 9, 1887. His father, Joseph H. Bragdon, founded *Textile Manufacturers Journal* in 1894. When the son graduated from Yale in 1911, he joined the staff of that publication. In 1915 he was active in a merger which joined *Textile Manufacturers Journal* and *Textile World Record* into one publication, *Textile World*.

✦

C. A. Kincade

C. A. Kincade, head of the electrical distribution department of the Kansas City Public Service Company, Kansas City, Mo., since 1918, died unexpectedly on March 14, from heart disease. Mr. Kincade was born on Jan. 2, 1877, in West Virginia. He entered the employ of the old Metropolitan Street Railway in Kansas City in 1900 as a gripman on the old Twelfth Street cable line. Three years later he was transferred to the electrical department as a substation operator and a year later became assistant to the electrical engineer. In 1907 he was placed in charge of all overhead and conduit construction and maintenance work and in 1918 became superintendent of electrical distribution.

✦

John Wernsdorfer, 80 years old, employed by the United Railways & Electric Company, Baltimore, Md., for 58 years, died on Feb. 20. He was pensioned about ten years ago, but continued to serve as vice-president of the United Railways Twenty-Five Year Club. Mr. Wernsdorfer started as a track walker, but advanced step by step to be foreman of the track construction department.

✦

Cecil R. Pillsbury, assistant treasurer of the General Steel Castings Corporation at Granite City, Ill., died at Philadelphia, Pa., on Feb. 19. Mr. Pillsbury was 53 years old. He started with the Commonwealth Steel Company as a checker at $2 a day sixteen years ago. He gradually advanced until he was made treasurer, a position he held when that company merged with the General Steel Castings Corporation last July.

✦

Jacob H. Maag, foreman of maintenance of way and structures of the Los Angeles Railway, Los Angeles, Cal., died in that city on Feb. 27, at the age of 71. Fifty years of his life had been spent in railroad construction work, and he was one of the eye-witnesses to the joining of the rails uniting San Francisco and Los Angeles by railroad on Sept. 5, 1876, at Lang Station, near Newhall, Cal. From 1882 to 1904 he was section foreman for the Southern Pacific Railroad and then he entered the employ of the Los Angeles Railway as foreman of maintenance of way and structures, a position which he held for nearly 26 years.

✦

Nathaniel C. Robbins, New York advertising sales representative of *Power*, a McGraw-Hill publication, and veteran of service with the Astor Battery in the Spanish-American War, died at Nyack, N. Y., on March 16, following an illness of three months. Mr. Robbins was graduated from Cornell University in 1894. In addition to his service with the Astor Battery, he was a widely known veteran of the Seventh Regiment, New York National Guard. At the close of his service in Cuba, Mr. Robbins became associated with the Hill Publishing Company, then publisher of *Power*. He had served that company and its successor, the McGraw-Hill Publishing Company, since 1900.

✦

Oliver B. Barrows, for more than 30 years St. Louis representative of the American Steel & Wire Company, died on Feb. 25. He was born in Janesville, Wis., in 1863. He was made St. Louis representative of the American Steel & Wire Company in 1900.

✦

George Wright, chairman of the Toronto Hydro-Electric Commission, died at his home in Toronto, Ont., on March 17, in his 64th year. Mr. Wright was for many years a member of the Toronto Transportation Commission, operating the municipally-owned railway and bus system in Toronto. He was among the first of those in the province of Ontario who saw the possibilities of public development of hydro-electric power and light, and was closely associated with the late Sir Adam Beck in the early days of the enterprise.

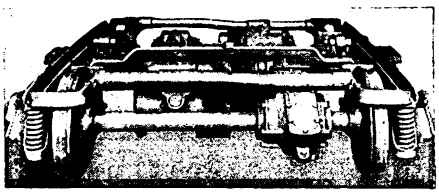
Digitized by Google

Comfort and Speed on New Allegheny Valley Cars

By J. G. Inglis
General Engineering Department
Westinghouse Electric & Manufacturing Company

TWELVE new, high-speed, light-weight cars have completely modernized the rolling stock on the lines of the Allegheny Valley Street Railway, a subsidiary of the West Penn system.

The line runs parallel to the Allegheny River near the city of Pittsburgh, Pa. One branch extends upstream from New Kensington to Natrona, approximately 7 miles; the other extends downstream to Aspinwall, 11.73 miles. Service on the upper branch was formerly provided by six cars operating on a 15-minute headway with a 90-minute round-trip time. Two extra cars were operated in the rush hours, as the community is an industrial center.



Ample clearance under motor and gear unit is provided with 22-in. wheels

On the lower branch to Aspinwall four cars operated on a 30-minute headway with a round-trip time of two hours. No extra rush-hour service was necessary on this branch.

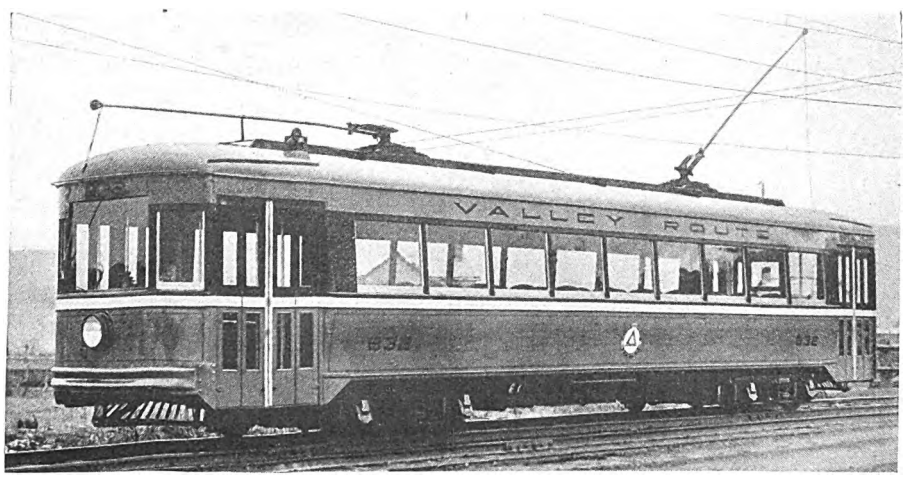
In considering modern equipment to replace the old cars, several refinements were necessary to meet the ideas of the company's engineers. One-man car operation was to be instituted, a low car floor was desired, and the running time on the Aspinwall line was to be cut 25 per cent, also the car weight was to be held to a point so that satisfactory operation could be obtained with 35-hp. motors.

Complete but without load, the new cars weigh 32,100 lb., have quadruple 1425-A motors (35 hp., 300 volt) geared 4.75:1 with WN drive to 22-in. wheels. The control is double-end K-75 with TA handle switches and lightweight Type M resistor. The free running speed of the new cars is 43.5 m.p.h., approximately 10 m.p.h. faster than the old ones. Seating capacity has been provided for 48 passengers, with well-upholstered, reversible seats finished in Spanish brown leather. Wide windows, narrow sashes, good lighting and an unobstructed view at the front of the car have been combined to make the ride of the passenger as pleasant as possible.

The mounting of the motors and WN drive as well as some of the features of the truck construction are of especial interest. The trucks are the Cincinnati Car Corporation's cantilever type with certain modifications to care for WN drive. A transverse tubular motor support carries one-half of the motor weight, while the other half of the motor weight and half of the gear unit weight are held by clevis castings supported by the transom. Positively centered thermoid disk couplings are used. The link between the gear unit and the clevis casting has a ball and socket joint at each end, permitting freedom of motion in any direction to take care of the movement of the car axle. The brake rigging is the West Penn standard, helping to give a very neat appearance to the truck. Tranverse leaf springs and coil journal-box springs contribute to the riding qualities of the car. Brake hangers are so constructed that noise is prevented even when the parts become worn. Rigid attention was given to all factors which would promote riding comfort.

There are several ways in which the motor and drive helped to meet the requirements of the railway company in this application. Chief among these is the matter of weight reduction. By utilizing a high-speed motor wound for 300 volts, high temperature insulation and a double reduction drive, sufficient clearance was obtained to permit the application of 22-in. wheels. The resulting economies in weight were sufficient to bring the total car weight to 32,100 lb., without the necessity of utilizing aluminum construction except in the seats and around the control panels. The body weighs 18,700 lb., while one truck complete with motors weighs 6,600 lb. with rolled-steel wheels, or 6,800 with cast-steel wheels. This truck weight is the lightest of any WN drive truck in operation. The 6,600 lb. for the truck with rolled-steel wheels corresponds to 7,850 lb. for a truck recently built and equipped with axle-hung 35-hp. motors and 26-in. rolled-steel wheels. This corresponds to a reduction of 2,500 lb. per car and, if axle-hung motors had been considered for the Allegheny Valley cars, such an increase in car weight would have been almost certain to prohibit the application of 35-hp. motors for the schedule desired.

Through the utilization of 22-in. wheels, it has been possible to construct the cars with only one step and without a ramp in the floor. This reduces accident hazards and claims and cuts down the stop time, permitting higher schedule speeds. The latter is of especial interest to the transportation department of the company because the schedule under which the cars will operate is a difficult one. The gear ratio had to be chosen so that a high balancing speed would be available where there was an opportunity to use it, while a high accelerating rate was desired in the frequent-stop service.



Wide windows, narrow sashes and a single step contribute to attractive appearance of new West Penn cars

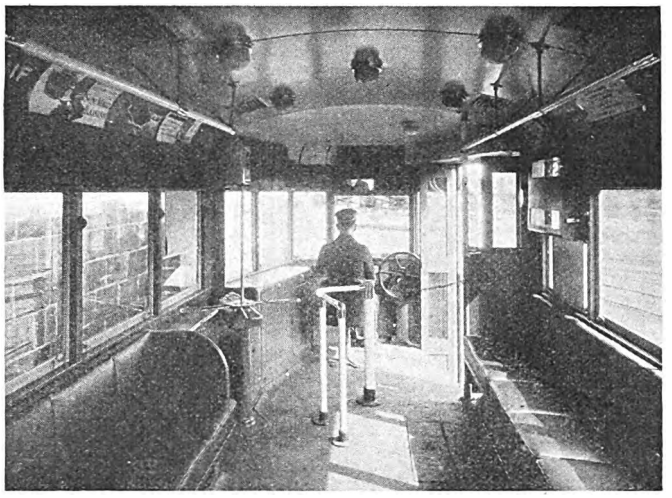
New Brooklyn Cars Now in Service

The first of an order of 100 trolley cars, ordered during the latter part of last year by the Brooklyn & Queens Transit Corporation, have arrived and are now in service in that city. It is expected that the entire 100 cars will be in service within the next two months. The order was divided between the Osgood-Bradley Car Company, of Worcester, Mass., and the J. G. Brill Company, each concern supplying 50 cars.

Cars are equipped with four 35-hp. motors, and the control equipment is of the automatic acceleration type similar to that used on subway cars. This feature makes the new cars especially effective in congested traffic areas as it is expected to enable them to keep abreast of, if not outdistance, automobile traffic using the same streets. This type of control permits the car to pick up speed rapidly and automatically and without any noticeable jolting as it changes from one speed to another. Acceleration is provided at the rate of 3 m.p.h.p.s. and deceleration, or braking, at the rate of 2½ m.p.h.p.s. This is an unusually high rate of acceleration for a surface car and is required to enable the cars to pick up speed, when starting, as rapidly as an automobile. Control and motor

Digitized by Google

Wide windows, ample and well distributed illumination and comfortable seats contribute to the attractiveness of the new Brooklyn cars



Forward platform of new Brooklyn car, showing motorman's control and arrangement of automatic turnstile at entrance to passenger well

equipment was provided by the Westinghouse Electric & Manufacturing Company.

The new cars are of the front entrance, center exit type, and are equipped with prepayment fare turnstiles. In order to give maximum seating capacity, single-end control is provided. The cars have seats for 54 passengers. Leather upholstered, spring cushion seats are supplied, the supports and backs of which are made of aluminum. Thirty-two of the seats are arranged in pairs—ten pairs on one side of the car and six pairs on the other—and the remaining 22 seats are single seats running lengthwise along the sides and around the rear end. This arrangement is designed to provide a maximum of aisle space.

Detailed specifications include:

Air brakes	Westinghouse
Armature bearings	Plain
Axles	3½x7-in. Carnegie
Car signal system	Faraday
Compressors	Westinghouse D-H-16
Conduit	Metal
Destination signs	Hunter illuminated roll
Door mechanism, Consolidated Car Heating Company	
Doors	Folding
Energy saving device	Arthur
Fare box	Perey, on passimeter
Finish	Enamel
Floor covering	Tuco
Gears and pinions	Nuttall
Hand brakes	National Brake Company
Heaters	Railway Utilities Company
Headlights	Ohio Brass Company
Headlining	Aluminum
Journal bearings	Plain
Journal boxes	J. G. Brill
Lamp fixtures	Electric Service Supply Company
Motors	4 Westinghouse, No. 510-A, inside hung
Roof material	Wood, canvas covered
Safety car devices	Westinghouse
Sash fixtures	O. M. Edwards Company
Seating material	80 cars, leather; 20 cars, wood
Slack adjusters	Westinghouse
Steps	Stationary
Step treads	Feralun
Trolley catchers	Ohio Brass Company
Trolley base	Ohio Brass Company
Trolley wheels	Ohio Brass Company
Trucks	J. G. Brill, 177-E-1
Ventilators	Railway Utilities Company
Wheels	Rolled steel, 26 in. diameter
Lifeguard	H-B

By the use of aluminum for interior panels and headlining, with the car body itself constructed of steel, the weight is kept to 37,000 lb. The roof is of the arch type with twelve ventilators. Porcelain handrails suspended from the ceilings at a height of 6 ft. from the floor take the place of hand straps. The floors are of the same composition as the floors of subway cars, a ½-in. layer of this composition being laid over steel sheets ½ in. thick. Each car cost approximately $16,000.

Contracts Awarded for New Baltimore Cars

Of the 150 new street cars which have been ordered by the United Railways & Electric Company, of Baltimore, announcement of which appeared in ELECTRIC RAILWAY JOURNAL NEWS of March 22, 1930, 100 will be built by the J. G. Brill Company and 50 car bodies will be supplied by the Cincinnati Car Company. The Brill Company is to supply trucks for the entire order. The total estimated cost of the new rolling stock is set at $2,550,000.

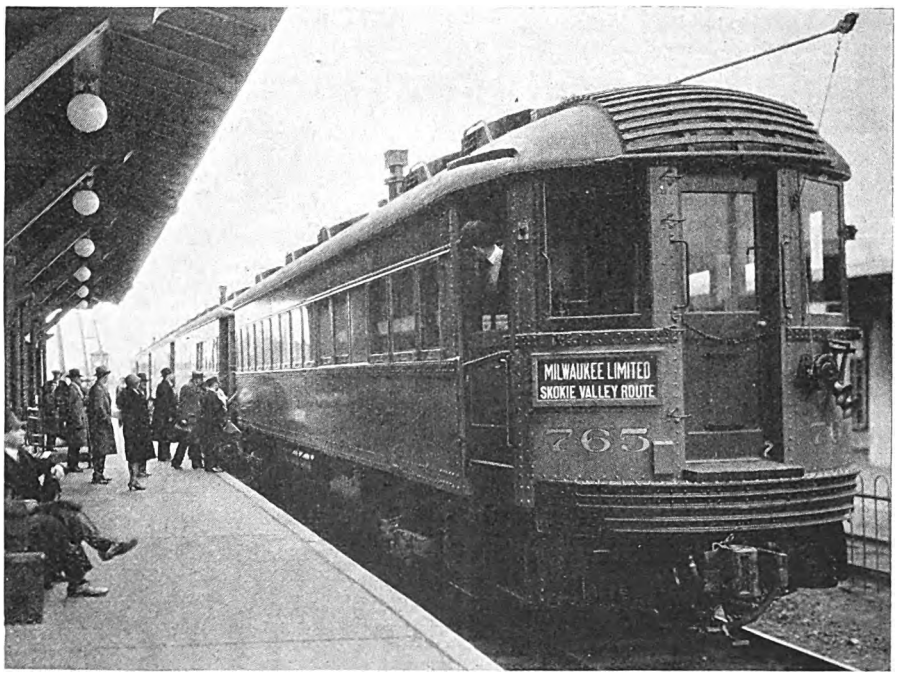
The new cars are to be of all-steel construction and will embody all of the latest developments making for passenger comfort, quick loading and alighting, and quiet operation. Front entrance and center exit arrangements will be incorporated in the design, the passengers depositing their fares as they pass the conductor, who is to be stationed near the center of the car. Quick acceleration and deceleration will be provided so as to enable the new cars to take their place in high-speed traffic.

Prior to the awarding of the contracts, representatives of a number of car builders as well as appliance manufacturers were invited to Baltimore and acquainted with the company's ideas, following which a number of tests were made at the Carroll Park shops of the United Railways & Electric Company. Complete specifications are not at present available but will be announced at an early date.

North Shore Line Receives 25 New Motor Cars

Twenty-five new all-steel passenger motor cars, costing approximately $850,000, have been delivered to the Chicago, North Shore & Milwaukee Railroad by the Standard Steel Car Company, of Hammond, Ind. This makes a total of 40 new all-steel motor cars purchased by the North Shore Line during the past two years.

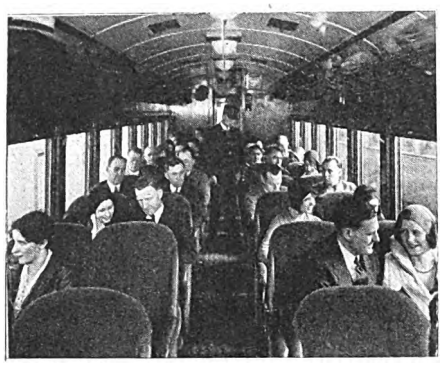
The new cars are provided with easy-chair type seats upholstered in Byzantine plush, a double heating system (hot water



General view of five-car train made up of new all-steel coaches, 25 of which have been placed in limited service on the North Shore Line

Digitized by Google

and electric) thermostatically controlled, two toilets and a smoking compartment in each car, an auxiliary lighting system for emergencies, larger windows increasing visibility for passengers, and individual ventilators in each window, as well as electric fans and ceiling ventilators in each car. Each car has four motors with a total of



Individual easy chairs are a feature of the new coaches recently acquired by the North Shore Line for service between Chicago and Milwaukee

560 hp., and weighs 51 tons. Improved air-brake equipment and motor control are important mechanical features. The cars are painted in the new North Shore Line colors, orange with maroon trimmings, adopted as a measure of public safety by increasing the visibility of trains.

Trolley Buses Arrive in Knoxville

Four trolley buses, intended for service on the Cumberland and Kingston Pike lines of the Knoxville Power & Light Company, have arrived in that city and will be placed in regular service about May 1. The coaches, which seat 42 passengers each, were supplied by the Cincinnati Car Corporation at an approximate cost of $50,000.

ANNOUNCEMENT is made that the City of Detroit, Department of Street Railways, will open bids on April 11, 1930, for the furnishing of 130 cars of the Peter Witt type.

Considerable additional line work has been entailed in erecting a second overhead trolley wire parallel to the existing wire but the work is now well on the way to completion.

Chicago Surface Lines Orders Trolley Buses

As the result of the substantiation of the rights of the Chicago Surface Lines to supply bus service to certain sections of that city, orders have been placed for a total of 41 trolley buses to provide service over about 17 miles of route. The necessary expenditure has been authorized by the court and the new rolling stock is expected to be in service before many weeks. Twenty-nine of the vehicles will be built by the Twin Coach Company, of Kent, Ohio; six are to be supplied by the J. G. Brill Company, and six by the St. Louis Car Company. The buses are to be powered with two 50-hp. motors and will be supplied with four-wheel air brakes.

Twin Coach Company has also recently supplied two urban type coaches to the Milwaukee Electric Railway & Light Company and five 40-passenger urban type coaches to the Boston Elevated Railway. The Boston Elevated Railway has also added two 40-passenger metropolitan type coaches, which were supplied by the American Car & Foundries Motor Company. North Coast Transportation Company, of Seattle, Wash., has also received two ACF 264-in. wheelbase chassis.

The White Company, of Cleveland, reports the sale of eight of its Model 65 buses to the Denver Tramway Company; four Model 50B buses to the Middlesex & Boston Street Railway, of Newtonville, Mass., and one Model 54A bus to the Super Power Company, of Springfield, Ill.

J. G. Brill Orders for Equipment Exceed 1929

Receipt of an order from the United Railways & Electric Company, of Baltimore, for car bodies and equipment aggregating in value more than $2,000,000, puts the business of the J. G. Brill Company for the first quarter of 1930 about 100 per cent of orders received during the same period of 1929. Sales in the first three months of the current year have been running at the same rate as in 1929, but with the addition of the order from Baltimore sales will amount to approximately $4,000,000, or just about double the amount of the first quarter of that year. Unfilled orders on the books on Jan. 1, 1930, are said to have been approximately the same as those for the previous year.

Bendix and Westinghouse Form New Company

Announcement is made jointly by the Westinghouse Air Brake Company and the Bendix Aviation Corporation of the formation of a new company to be known as Bendix-Westinghouse Automotive Air Brake Company, the entire capital stock of which is to be held by the Bendix Aviation Corporation and the Westinghouse Air Brake Company.

The new company will continue the operation of what has heretofore been the automotive division of the Westinghouse Air Brake Company and will continue to supply the well-known Westinghouse air brake equipment for buses, trucks and other types of automotive vehicles. Westinghouse will continue the manufacture of the automotive air brake equipment for the new company.

General Electric Had Record Year in 1929

In volume of orders received, shipments billed, and in total profits and earnings per share of common stock, the year 1929 was the best in the history of the General Electric Company, according to the annual report for that year, just released by Gerard Swope, president. Orders received increased 28 per cent over 1928. Sales billed increased 23 per cent, net income from sales showed an increase of 24.5 per cent and earnings per share of common stock increased 25 per cent. Profits available for dividends amounted to $67,289,880, equivalent, after dividends on special stock, to $8.97 per share on the no par common.

Substantial expenditures were made during 1929 for the consolidation of manufacture of related products at one place. This policy has been found to improve service and efficiency and to reduce costs. No new buildings of importance were added, but a number of existing buildings were rearranged, and a total of $20,000,000 was expended upon plant improvements.

Star Brass Works, Kalamazoo, Mich., is distributing an attractive catalog illustrative of its products, which include trolley wheels and harps for street railways, mining operations, electric cranes and other uses.

ELECTRIC RAILWAY MATERIAL PRICES—APRIL 1, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	18.00
Lead, cents per lb.	5.50
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	5.25
Tin, Straits, cents per lb.	37.62
Aluminum, 98 to 99 per cent, cents per lb.	24.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	41.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.35
Somerset mine run, f.o.b. mines, net ton	2.00
Pittsburgh mine run, Pittsburgh, net ton	1.40
Franklin, Ill., screenings, f.o.b. mines	1.50
Central, Ill., screenings, f.o.b. mines	1.15
Kansas screenings, Kansas City	1.75

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ⅞ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.15
Angles bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.85
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.40

Hardware—Pittsburgh

Wire nails, base per keg	$2.30
Sheet iron (24 gage), cents per lb.	2.70
Sheet iron, galvanized (24 gage), cents per lb.	3.35
Galvanized barbed wire, cents per lb.	2.95
Galvanized wire, ordinary, cents per lb.	2.90

Waste—New York

Waste, wool, cents per lb.	14.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	11.00
Colored	10.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	14.6
White lead in oil (100 lb. keg), cents per lb.	14.25
Turpentine (bbl. lots), per gal.	0.61
Putty, 100 lb. tins, cents per lb.	5.725

Wire—New York

Copper wire, cents per lb.	19.875
Rubber-covered wire, No. 14, per 1,000 ft.	$6.15
Weatherproof wire base, cents per lb.	18.50

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	15.12
Light copper, cents per lb.	13.60
Heavy yellow brass, cents per lb.	8.12
Zinc, old scrap, cents per lb.	2.00
Lead, cents per lb. (heavy)	4.00
Steel car axles, Chicago, net ton	$16.25
Cast iron car wheels, Chicago, gross ton	14.75
Rails (short), Chicago, gross ton	18.25
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	7.75

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

Volume 74 New York, May, 1930 *Number 5*

Business Prospects Brighter

MOST authorities agree that the low point in the present business recession has been reached and that an upward trend will be witnessed during the coming months. Employment in manufacturing industries in March was a little lower than in February and nearly 9 per cent below March last year. Department store sales for March were about 12 per cent below those of a year ago. Recent reports, however, show a moderate but material improvement during the first two weeks of April.

Electric railway traffic in March, 1930, showed a decrease of about 7 per cent as compared with March, 1929, while the decrease in February was only about 4 per cent and in January a little more than 1 per cent, according to figures compiled by the American Electric Railway Association. From this it appears that the decline in traffic has lagged somewhat behind the business decline and has been considerably less severe. This is in accord with predictions made last fall after the sudden stock market crash that electric railway and bus traffic was unlikely to suffer a very large recession.

Improvement in general business conditions appears to be definitely under way. Consumption of electrical energy by manufacturing plants is increasing. Construction programs of far-reaching extent are being accelerated. While it is too early as yet for the improvement to be reflected in reports of the number of passengers carried, electric railway operators are distinctly more optimistic than they were a few weeks ago. It may be expected that the upturn of electric railway traffic will follow the upturn of general business more closely than did the decline. A tendency exists to continue using public transportation for a considerable period after unemployment begins. Only after a man has been unemployed for some time does he cease to use street cars and buses. But when he goes back to work he immediately begins to use public transportation again. In other words, the period of depression in the local transportation industry will probably be much shorter than in other industries. It is not likely that normal conditions will be restored immediately, but every indication points to steady improvement continuing during the spring and summer months.

Serviceable But Not Suitable

CENTURIES ago in Egypt the slaves of the Pharaohs labored to build the gigantic pyramids which remain a marvel to this day. The Romans in their turn, with marvelous skill and care, constructed hundreds of miles of aqueducts, many of which are still in use. In the middle ages workmen labored with religious fervor to raise the lofty spires of the beautiful cathedrals which charm the modern tourists. Throughout practically the entire period of recorded history men have struggled to create monuments that would endure forever.

Today we have a somewhat different viewpoint. No serious doubt exists that modern skill can design and build structures to last for centuries, but we seldom consider it desirable to do so. A new factor, one that did not bother the ancients, has entered into our calculations—obsolescence. We have learned that a thing may remain serviceable long after it has ceased to be suitable. Hence we have very largely abandoned the idea of building for eternity.

In the field of transportation this modern viewpoint finds particularly apt application. Possibly we might be able to design a vehicle like the famous "one hoss shay" that ran a hundred years to a day before it fell to pieces. But it is impossible to believe that the public would patronize it for anything like that length of time. Possibly we might design a track structure which with proper maintenance would last for generations, but it is extremely unlikely that we would find it satisfactory as to location, line, grade, etc., for so long a period.

Obviously, then, the wise plan is to design our structures and equipment with a certain definite objective in view. If replacement is anticipated at the end of ten or fifteen years, the best design is that which will assure the desired length of life with a minimum surplus. Engineers today should pride themselves on their skill in designing to accomplish a definite purpose rather than in the creation of monuments for posterity.

Small-City Properties Appraise Their Assets and Liabilities

THERE is no magic formula for success in small-city street railway or bus operation. Decreases in traffic have been experienced by many of the properties that are found in this class. Burdensome franchise requirements, inequitable taxation, onerous paving obligations, inflexible fare structures, top-heavy financial setups, unregulated taxicab operation and, above all, the competition of the privately owned automobile, have contributed to the troubles of the small-city railways. Yet for none of these ills is there an unfailing remedy. Each property must solve it own problems by a careful study of existing conditions.

In spite of the difficulties which the small-city property has encountered and with which it is still beset, there is good reason for a continued faith in the future of organized transportation in these communities. Without question there is less demand on the part of the public for this commodity than there was a few years ago. At the same time there is a marked reluctance to see the time-tried utility reduce its service or liquidate its plant. The local transportation system, be it bus or trolley, is

Digitized by Google

still regarded as a community asset, and the extension of service into newly developed areas now, as in the past, meets with favorable public response.

The brighter side of the picture is presented by those properties which have introduced aggressive merchandising methods in the sale of their service. This has taken the form of careful study of the fare structure, balancing service to meet the requirements of the public more satisfactorily, modernization of rolling stock, cultivation of improved public relations, and energetic solicitation of patronage from potential riders.

Certain instances will be found in which local remedies, available to all, have been applied with a considerable degree of success. While there is a general lack of adequate merchandising effort there is an awakening interest in this subject. Public relations are, broadly speaking, on a better basis than in the past, and municipal authorities are listening with increasing attention to appeals for relief from unnecessary burdens.

Such, in effect, were the conclusions reached at a three-day meeting of the committee on small-city operations held recently in New York.

If the "small city" hearings demonstrated any one thing, it was that we are living in an era of change and progress, in which the transportation industry, along with many others, must change its methods to keep in step with the changing tempo of events or face serious consequences.

Rhode Island Regulates the Taxi

RHODE ISLAND has followed Connecticut in placing the taxicab under responsible state regulation. For many months now the taxi situation in Providence and elsewhere in the state has been chaotic. In the operation of these vehicles there has been neither law nor order. The new legislation has behind it the thought that the taxi has a distinct place in the transportation field as a service to which the people are entitled, but the regulatory measure was enacted to correct conditions which had become a menace to the public welfare.

Under the new law the state utility commission is empowered to fix rates, specify service and stipulate the equipment needed. This is as it should be. That the United Electric Railways, Providence, advocated the regulation in no way militates against the soundness of its contention that cut-rate competition among the carriers is inconsistent. True, the earnings of the coordinated railway and bus system in Rhode Island were affected by the unfair cut-throat taxi competition, but the railway stands to profit in no way other than the removal of this unfair competition. If it seeks to enter the taxicab business itself the railway must prove the convenience and necessity of any lines it would run.

As in Connecticut, public regulation in Rhode Island should tend to raise the standard of taxicab service and eliminate cut-rate competition destructive to the taxi industry itself and harmful to the public by injuring a necessity service. Particularly does the requirement of public convenience and necessity guard the industry from internal destruction by those who would enter the field without any regard to the extent of taxicab service already furnished. That is sound doctrine. The public may patronize an unprofitable business while it lasts, but eventually the public pays the full penalty for the folly that permits unrestrained competition. In passing the new law the Legislature of Rhode Island has protected the taxicab operators against themselves.

Much Talk But No Progress Toward Unification

LEGISLATION looking toward unification of the rapid transit lines in New York City, including the new municipal subway system now nearing completion, has failed again at Albany. Under the proposed bill the city would have had the power to acquire privately owned lines and lease them together with its own new lines for unified operation, meeting from general taxation whatever deficits might result from the preservation of the sacred 5-cent fare. This proviso to permit the city to make up deficits from taxation was primarily responsible for the defeat of the proposal.

All along, the situation has been a mixture of politics and economics, two things that do not go well together. Both sides conceded that a 5-cent fare on the unified system was not assured unless the city received from the legislature authority to pay part of the cost of operation out of taxes. The majority in the legislature stood firmly against the unification bill unless this subsidy was eliminated. The mayor, however, would not consent to the elimination of the subsidy and the law makers therefore refused to pass the enabling legislation.

Since the legislature has adjourned without action, the city will be required under the existing law to charge a fully compensatory fare on its new lines after a development period of three years. Thus it appears that the nickel fare is doomed on these lines anyway, unless, as commentators on the situation point out, privately conducted negotiations can bring about unification of the old low-cost lines with the new high-cost ones under expert non-political management which can stretch the nickel to cover the combined interest charges.

For the present the battle is ended, but it is not entirely clear who is the victor. The majority in the legislature has won its point concerning the subsidy. The mayor, however, by the failure of the desired legislation has secured an alibi in the event of future difficulties. One thing that seems certain is that the public continue to lose by the further postponement of unification.

To Protect or To Harass?

CONSIDERATION is being given at present in a number of plans to the question of creating the office of "Peoples' Counsel" to represent the public in utility hearings before regulatory bodies. In a few communities this has already been done. It is difficult to see what good is to be accomplished by this plan. Its proponents claim that the utilities employ high-priced legal talent to present their side of the case and that the public should be equally well represented.

Everyone will agree that the interests of the public should be fully protected at hearings of this kind, but that scarcely seems sufficient reason to create a new office when nearly every town, city and state already has its legal staff. These lawyers are the logical persons to represent the public interest before regulatory bodies. If they are too busy with other matters, or are not properly qualified in questions of utility law, it is an easy matter to employ special counsel to handle any particular case. This has been done in many instances with excellent results.

If a "Peoples' Counsel" is created for the express purpose of representing the public at hearings before the

Digitized by Google

regulatory commission, a question immediately arises as to what he will do to keep busy in the intervals when no cases are under consideration. To this the most likely answer seems to be that he will occupy himself prying into the affairs of the utility to see if he can find something to criticize. Such procedure is entirely contrary to the fundamental principles of American government. In this country it has always been held that it is not the function of government to delve into the affairs of individuals and business concerns on the mere chance of uncovering evidence of wrong doing. The records of the public utilities are open to public inspection, and there is little reason to anticipate that a "Peoples' Counsel" would unearth dark deeds that have long laid hidden. It is very likely, however, that he would become a good deal of a nuisance and that the answering of his questions would waste a large amount of time and energy that might much better be devoted to the operation of the property. Probably he would feel that he had to make trouble in order to show that he was earning his salary. All in all the conclusion is inescapable that the real motive underlying the creation of such an office is not to protect the public but merely to harass the utilities.

The Growing Need for Public Transportation

SO MUCH is heard these days about the growing use of private automobiles that the growing need for public transportation receives relatively little attention. Yet this need is actually increasing year by year despite the remarkable development of the automotive industry and the multiplication of two-car families and even three-car families.

Fifty years ago more than 70 per cent of this country's population was rural. Just prior to 1920 a balance was reached between urban and rural population, each being approximately 52 million. During the past decade it is estimated that urban population has increased about 16 million and rural population not more than 2 million, making the present ratio about 55 to 45. If this trend continues, as there is every reason to expect, the relationship existing in 1880 will be completely reversed by 1965 when more than 70 per cent of the total population will be urban.

Inasmuch as the largest part of the public transportation business is done in the urban communities, this shift of population is very significant. It means a steady increase in the number of potential customers. Moreover, experience has shown repeatedly that the riding habit on public transportation vehicles tends to increase as the population increases.

Thus it is evident that future demands for public transportation are likely to be greater than those existing today, rather than less. Just what form this demand will take, whether it will be for street car, rapid transit, bus, trolley bus, or taxicab service, cannot accurately be forecast. Most likely it will be for a combination of these services, each doing the work for which it is best suited. Meeting this future demand will undoubtedly present many complex problems. Public transportation agencies cannot fold their hands, sit back, and wait for their business to grow. They must be constantly alert to keep pace with changing conditions and habits of living. If they are prepared to render service when, where and as wanted, there is every reason to expect that the demand for their service will steadily increase.

Higher Accelerating and Braking Rates Bring Faster Schedules

HIGHER schedule speeds for transportation vehicles are today more essential than ever before, if the competition offered by private vehicles is to be met. Speed always is attainable—at a price. Although the original appeal of the street railway was based on speed, transportation men have been content to hold down the cost and with it the possibilities for speedy rides that will attract the public. In general the equipment has been chosen for economy rather than for the possibility of making fast schedules.

Examine for a moment the factors that determine the schedule speeds for runs such as are met in surface or ordinary rapid transit service. These principles, by the way, apply equally to electric cars, buses and steam trains. The factors are the rate of acceleration, the rate of braking, and the time consumed in stops. The last factor is determined by the location and arrangement of the stopping places, the number of passengers on and off, and the load already on the vehicle. It is influenced to a considerable extent by the design of the vehicle and the arrangement of doors and steps. Few of the older vehicles are properly arranged to permit quick loading and unloading.

Seldom is it realized that the maximum speed at which the motive power can drive the vehicle can have little effect on the schedule possibilities because the ordinary run is too short. The fastest run that can be made between any two points demands the highest possible rate of acceleration for a portion of the time, followed by the highest rate of braking for the remainder. It is only when the run is so long that it is uneconomical to keep up the maximum acceleration that the speed characteristic has any influence. In order to make a schedule practical for use day after day there must be some reserve. Ordinarily this is obtained by allowing the vehicle to coast for a certain portion of the time.

For short runs—and in this class falls practically all surface and rapid transit service—the equipment should be chosen solely from the standpoints of acceleration and braking. High braking rates ordinarily are less difficult to attain, and cost less for the equipment and for its operation, than equal rates of acceleration. The only practical limit to the rate of braking is slipping of the wheels. It is surprising that higher rates of braking are not used regularly in service. Passengers are not inconvenienced by rapid braking if the equipment is properly designed and properly handled.

Acceleration is determined by the tractive effort used in proportion to the weight of the vehicle. The horsepower is involved only indirectly. Hence reduction in the weight of the vehicle is just as valuable in getting higher accelerating rates as increasing the size of the motive power. Before deciding to use heavier motors, then, every attempt should be made to reduce the weight of the vehicle. This in turn keeps down the weight of the motors themselves, so that there is a reciprocal advantage.

Even the most recent designs of cars fall far short of reaching the practical limits of acceleration and braking. Every attempt should be made by vehicle operators and manufacturers to build designs that will give acceleration and braking rates in line with the trends of today. Otherwise the transportation business is bound to suffer.

Digitized by Google

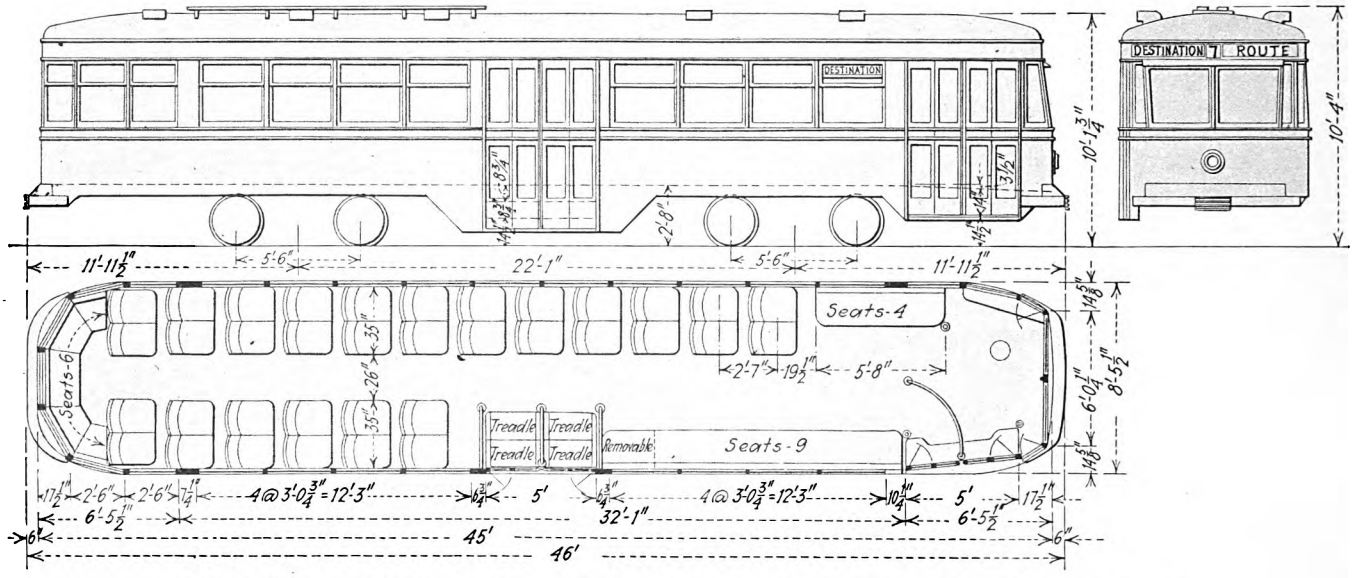
Extensive Rolling Stock Reha

By

DEAN J. LOCKE *and* A. T. CLARK

Research Engineer — Superintendent of Equipment

United Railways & Electric Company of Baltimore



United Railways & Electric Company of Baltimore has recently placed orders for 150 new single-end, front-entrance, center-exit cars of this design seating 55 passengers

1930 Transportation Service for 1930

THIS is now the Baltimore motto in executive offices, shop, carhouse, power station, bus garage and "out where the rush begins." During the summer 150 new cars will be placed in operation and 262 present-type cars will be completely rejuvenated, from running gear to roof. This extensive program of rolling stock rehabilitation has been made possible by the recent favorable decision of the United States Supreme Court in the Baltimore fare case, which permits the company to charge a straight 10-cent fare for all adult passengers.

There is more to the 10-cent straight fare, however, than just "getting it" and then collecting it. That part of the problem arising from the widespread use of the automobile for personal transportation does not disappear just because it suddenly begins to cost 10 cents to take a street car ride. Automobile users don't mind paying more for transportation—they wouldn't be using automobiles if they did mind—but they want something for the money.

For a year previous to the conclusion of the "Baltimore fare case," thousands of tests of the present-type cars and of numerous remodeled cars were made, both on the specially designed test track and in regular service, in anticipation of the favorable decision, for the purpose of determining what the design and performance of new cars should be, and how the present cars could be operated more effectively.

The new cars will be of the double-truck, single-end, front-entrance, center-exit type, having an over-all length of 46 ft. All of the cars will be mounted on Brill 177-E-1 trucks with 5-ft. 6-in. wheelbase and 26-in. rolled steel wheels. Each car will have four 50-hp. motors, either Westinghouse 516-A or General Electric GE-301. Automatic control of the PCM and VA type will be used, in order to obtain a smooth acceleration of 3.25 m.p.h.p.s. The total weight is expected to be about 39,000 lb. The J. G. Brill Company will build 100 of the bodies and the Cincinnati Car Corporation will build 50.

Westinghouse air brakes will be used, designed to stop the car at a rate of 3.5 m.p.h.p.s. with a load equal to three-quarters of the seating capacity. This is made possible through use of the new Type M-33 self-lapping motorman's valve, a 12x12-in. brake cylinder, and brake rigging designed with 150 per cent ratio. Doors and brakes will be pneumatically interlocked. The trucks are designed so that track brakes may be attached should it be found desirable to do so at some future date.

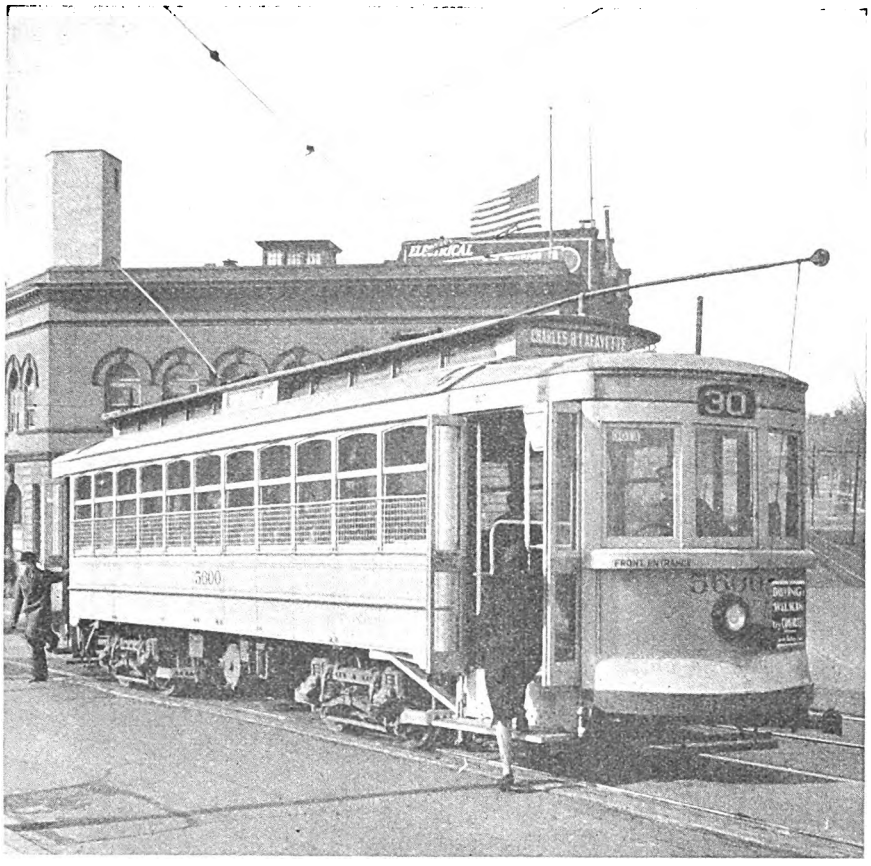
While the new car is intended primarily for one-man operation, two men can be used if desired. The center exit doors fold outward and are independently controlled by two automatic treadle plates. Manual operation can

Digitized by Google

bilitation

At Baltimore

New cars quickly ordered following fare increase are designed for comfort and speed. In addition to the 150 new cars, 262 of the present cars will be rebuilt during 1930. Rates of acceleration and braking will be nearly doubled, and free running speed increased 25 per cent. Pneumatic door control and safety devices to be installed



Remodeled car is arranged for one-man operation, entrance being at the front and exit at the rear by means of a treadle door

be substituted for treadle operation on these doors, however, when a conductor is used on the car. The front entrance doors fold inward into a step well.

Seating accommodations for 55 passengers are provided. The seats are of the semi-bucket type arranged in twelve pairs on the left side of the car, with six additional pairs on the right side of the car in rear of the exit door. A curved seat at the extreme rear seats six and a longitudinal seat on the right side between the front and center doors will accommodate nine passengers. Opposite the entrance door is a short longitudinal seat for four passengers. This arrangement was adopted because it was believed to be the most advantageous for rapid loading. All seats will be upholstered in leather. Above the longitudinal seats enameled hand rails are provided for the convenience of standing passengers, while large enameled grab handles are available on the high backs of all the transverse seats. The floor will be level throughout except for a 2½-in. ramp at the front end. It will be without trapdoors and will be covered with $\frac{3}{16}$-in. battleship linoleum.

The car roof will be of plain arch type with ten ventilators arranged in two rows. There will be ten wide windows between the corner posts on the left side and eight on the right side, as well as six windows above the curved seat at the rear, and one on the left side of the front platform. The windows will be arranged in two sections, the upper sash being stationary and the lower sash designed so that it can be raised easily by a seated passenger. Sash frames will be of tubular brass. Artificial illumination will be provided by twenty dome fixtures arranged in two rows above the center line of the cross seats. Each fixture will be provided with a 36-watt lamp.

Analysis of Car Performance During Rush Hours, Fremont Avenue Line

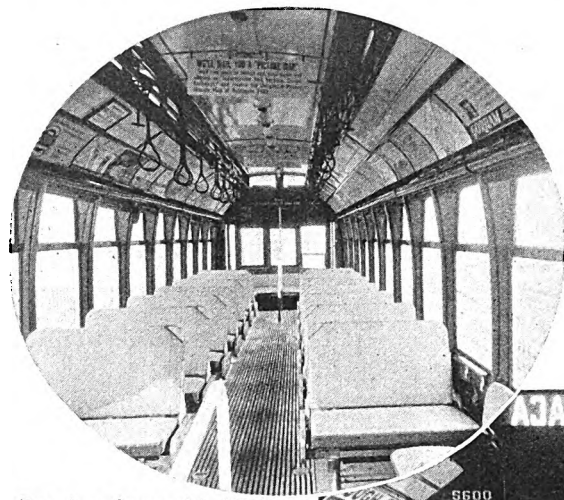
	Old Single Truck Car	Remodeled Double Truck Car	Increase or Decrease	Per Cent Increase or Decrease
Number of stops made	71	71	0	0
Stops per mile	8.6	8.6	0	0
Slow downs	33	44	+11	+33.3
Total time in motion	47 min. 53 secs.	42 min. 15 secs.	—5 min. 38 secs.	—11.7
Total power-on time	24 min. 9 secs.	22 min. 39 secs.	—1 min. 30 secs.	— 6.2
Total coasting time	11 min. 22 secs.	8 min. 54 secs.	—2 min. 28 secs.	—21.6
Total interference time	3 min. 50 secs.	2 min. 36 secs.	—1 min. 14 secs.	—32.1
Total braking time	8 min. 32 secs.	8 min. 06 secs.	—0 min. 26 secs.	— 4.7
Average speed, excluding stops	10.3 m.p.h.	11.7 m.p.h.	+1.4 m.p.h.	+13.6
Average of maximum speeds of individual runs, excluding stops	13.1 m.p.h.	15.5 m.p.h.	+2.4 m.p.h.	+18.3
Average speed at power cut-off	12.1 m.p.h.	15.3 m.p.h.	+3.2 m.p.h.	+26.4
Average speed ten seconds after starting	11.5 m.p.h.	13.8 m.p.h.	+2.3 m.p.h.	+20.0
Average acceleration rate for first ten seconds after starting	1.15 m.p.h.p.s.	1.38 m.p.h.p.s.	+0.23 m.p.h.p.s.	+20.0
Average speed at brake application	11.4 m.p.h.	13.9 m.p.h.	+2.5 m.p.h.	+21.9
Average braking rate	1.53 m.p.h.p.s.	2.05 m.p.h.p.s.	+0.52 m.p.h.p.s.	+34.0
Weight of car	27,700	43,600	+15,900	+57.4
Seats in car	41	50	+9	+22.0
Kilowatt-hours	24	32	+8	+33.3
Kilowatt-hours per car-mile	2.90	3.87	+0.97	+33.4
Watt-hours per ton-mile	165	155	—10	— 6.1

Digitized by Google

The front end of the car will be of the so-called automotive design with comparatively little curvature. The front vestibule window will slope inward at the top, and will be divided into two sections so arranged that one section will slide in front of the other, to give the operator unobstructed vision in foggy weather. Non-shatterable glass will be used in the sliding portion. Two mirrors are provided for the operator, one showing the interior of the car and the other arranged so that he can see what is happening at the center exit doors.

Existing Cars Remodeled

Coincident with the making of plans to purchase these new cars it was decided to remodel a considerable number of the cars now in service. The cars chosen for remodeling are of the double-truck, double-end, semi-convertible, two-man type, seating 47 passengers. Besides increasing the acceleration and braking rates, the remodeling involves also the elimination of doors on the left side of the car, the removal of control at one end and the installation of pneumatic door-operating devices. A single notch controller and straight air brake will be placed at the rear end for backing up and emergency movement. The remodeled cars will have double entrance doors at the front end and single treadle-operated exit doors at the rear. So arranged, they will be suitable for one-man operation. Other plans provide for the conversion of the present-type car into articulated units.



Interior of remodeled Baltimore car, showing fourteen double cross seats, with curved seat on rear platform and longitudinal seat opposite entrance

As remodeled, the single car weighs 43,600 lb. and seats 50 passengers. It is mounted on Brill 27-GE-1 trucks and is equipped with K-35 controllers and four GE-200-I, 40-hp. motors. The accelerating rate has been increased from 1.75 to 2.70 m.p.h.p.s. by shunting the motor fields on the third and succeeding points of the controller and by improved manipulation of the controller. The braking rate has been increased from 1.75 to 3.00 m.p.h.p.s. by installation of the Westinghouse Type M-33 self-lapping motorman's valve, by substitution of a 12x12-in. brake cylinder instead of a 10x12 in., and strengthened brake rigging to give a 150 per cent braking ratio instead of 100 per cent.

The shunting of the fields increased the free running speed from 27 m.p.h. to 33 m.p.h. These changes have resulted in a decrease of 9.7 per cent in the actual running time between terminals of the Fremont Avenue line which, was equipped with twenty rebuilt cars during the latter part of January of this year. While this comparison is between services with old single-truck, two-motor cars and remodeled double-truck, four-motor cars, it is indicative of the improvement produced by the remodeling of the double-truck type of car, since the original speed of the car before being remodeled was no better than that of the single-truck car.

In making the studies preparatory to remodeling, a portable testing set was used to secure a graphical record of car performance throughout the entire day's normal operation. This set records automatically on a 7-in. moving strip of paper, superimposed graphs of car speed, line voltage, current demand and air-brake pressure, and indications of distance run in 100-ft. increments, time elapsed in five-second increments and location of stops. The set is mounted on a cross seat and is supervised by one observer, who records on the chart data pertaining to the run, with particular reference to any abnormal conditions encountered. Separate instruments record kilowatt-hours of energy consumption and power-on time.

Electric fare box for coins of three different denominations, Type M-33 self-lapping motorman's valve, motor field shunting and dead man control are features installed on the remodeled cars

In the routine procedure of analyzing a line, the set was first installed on a car which had not been rebuilt. A sufficient number of regular service runs were covered to give accurate data on peak and off-peak average operating conditions. After the data had been obtained

Comparison of Old and New Operating Schedules, Fremont Avenue Line

	Schedule		Increase or Decrease Made by New Schedule	
	Old	New	Amount	Per Cent
Average speed between terminals	7.82 m.p.h.	8.68 m.p.h.	+0.76 m.p.h.	+ 9.7
Car-hours	217.5	206.9	—10.6	— 4.9
Car-miles	1,480	1,552	+72	+ 4.9
Seat-miles	60,680	70,600	+16,920	+27.9
Capacity-miles	81,400	116,400	+35,000	+43.0
Ton-miles	25,300	37,600	+12,300	+48.6
Base headway	7½ minutes	7 minutes	—½ minute	— 6.7
Peak headway	3 minutes	3 minutes	—0	— 0.0
Cars required on peak	20	18	—2	—10.0
Cars required on base	10	9	—1	—10.0

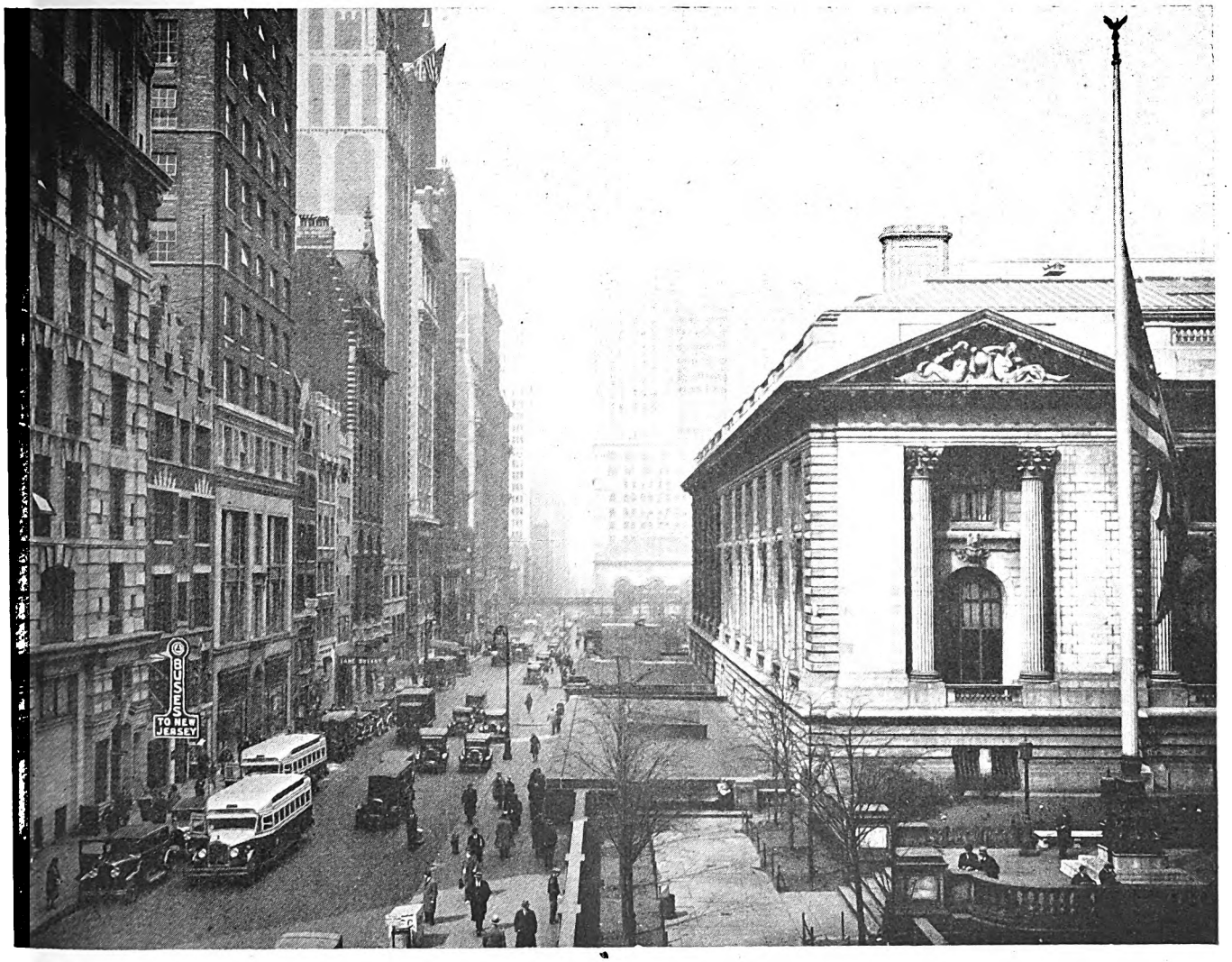
Digitized by Google

an analysis was made of the time consumed at stops and between stops. Data pertaining to the car itself, the passengers and external influences were segregated. Similar runs were then made with a remodeled car operated on the line with old cars and from the data obtained similar facts were developed, due allowance being made for handicaps imposed by the older cars and the slower schedule. Midnight runs were then made with both old and rebuilt cars loaded to seating capacity, the cars being operated by the motorman instructor at the greatest possible speed consistent with safety and good operating practice. Stops were made as in regular rush-hour service. The data from all these runs, after being properly analyzed and summarized, indicated the running times of the rebuilt car for different periods of the day. These were incorporated in a new schedule to provide the service on the line when fully equipped with rebuilt cars. By this means the number of cars required, the operating costs and savings were determined accurately in advance, and a new schedule was made up.

With the installation of a schedule involving new operating technique, new equipment and materially reduced running times, a follow-up program was necessary to eliminate mechanical difficulties and to allow the operating force to become fully accustomed to the new conditions. In this program the car testing set was used to analyze the performance of individual operators, thus assisting the chief motorman instructor to determine which motormen had difficulties in operating the remodeled equipment.

An accompanying tabulation shows operating conditions with both old and rehabilitated cars on the Fremont Avenue line, which was entirely equipped with this type of rolling stock. It indicates the degree of accomplishments possible on other similar lines of the Baltimore system.

Public Service Suburban Bus Terminal in New York City



In the heart of the retail shopping district of New York City, a terminal has been established by Public Service Co-ordinated Transport for buses running to suburban towns in New Jersey. The location is on the south side of 40th Street, about 100 ft. west of Fifth Avenue, and opposite the New York Public Library. At this convenient spot attractive and comfortable facilities have been provided for waiting passengers. A ticket agent is on duty inside the terminal, while a starter on the street regulates headways and announces the departure of buses.

Digitized by Google

All street car and bus routes operate either to or on Main Street

Income Increased by

CO-ORDINATION *at*

ON THREE occasions within the past five years, municipal and state highway paving programs have included routes over which the Poughkeepsie & Wappingers Falls Railway operated street car service. Franchise obligations demanded the company's participation in these programs if street car operations were to be continued, and meant the expenditure of large sums of money for the rehabilitation of the track area. The only alternative was the substitution of buses for street cars. In two instances this substitution was made, while in the other it was decided to continue car operation.

The railway assumed its share of the repaving costs on Main Street and, in addition, completely reconstructed the track and overhead equipment. On the local south side line in Poughkeepsie and on the interurban route between Poughkeepsie and Wappingers Falls, car operations were abandoned and buses put into service in the community for the first time.

Particularly significant was the substitution of buses on the interurban line because of its effect on both the economic and operating conditions of the system. This substitution released approximately 7 miles of private right-of-way which was sold, the proceeds of which were used to retire all claims held by the City of Poughkeepsie for the repaving of Main Street.

The Poughkeepsie & Wappingers Falls Railway is owned by the Hinkley family, two members of which, Mrs. M. M. Hinkley and Miss Mary Hinkley, participate actively as president, and vice-president and treasurer respectively. Operation of the company is under the direction of Hemphill & Wells, consulting engineers of New York City, with John A. Nilan as resident manager. The area served has a population of approximately 40,000. One line now served by buses extends 7 miles beyond the city limits to Wappingers Falls, a town of about 3,000 residents.

The Main Street car line, covering a route of approximately 3 miles, is the most important and profitable operation of the system. Its western terminus is at the Hudson River ferry landing from Highland, N. Y., across the river, and at the railroad station of the New York Central Lines. From that point the line runs directly through the main street of the city, on which are located all of the business, shopping and theatre districts, thence through a residential section terminating at Vassar College. Service is supplied by 32-passenger Birney cars operating on headways of eight minutes until noon, six minutes from noon until 9 p.m., with two additional trippers in the evening rush hour, and then eight minutes until midnight. Eight cars are used on the six-minute

Digitized by Google

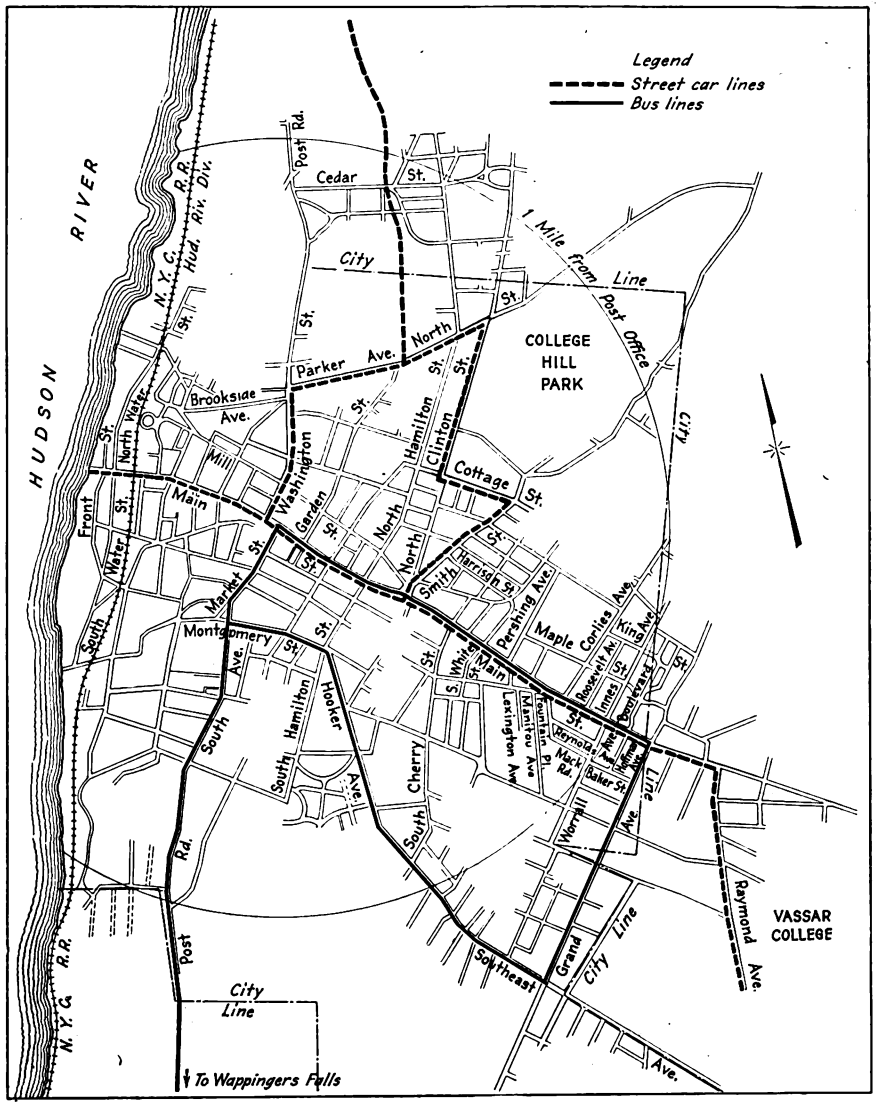
schedule. All the cars are in good condition and are capable of many more years of service. Main Street was partially repaved in 1921 and completed in 1923, at which time complete rehabilitation of the track and overhead structures was effected, and it is estimated that no major changes will be made on them within the next ten or fifteen years. At the present time they are in excellent condition.

The Main Street line is double-tracked over its entire length with the exception of several hundred yards at its eastern extremity on Raymond Avenue. On this avenue the route is on private right-of-way and open track construction is used. This route connects with all other bus and street car lines in the system and is duplicated for only a few blocks in its central section by the North Side car line and by the South Side buses. These partially paralleling services do not compete to any material extent with the operations of the Main Street line but draw their patronage almost exclusively from the north and south residential districts. General riding on Main Street is by street car.

As on all the other local lines, whether car or bus, the fare is 10 cents cash or one token which may be purchased at six for 50 cents. This fare has been in effect since May 9, 1925, at which time it superseded a straight 8-cent cash fare. Gross earnings per car-mile on this line since 1925 are shown in the following table in comparison to those on the other routes.

Larger revenue and lower operating expenses with material decrease in fixed charges follow partial substitution of buses for street cars. Prospects for future are good

Poughkeepsie



Reorganization of service in Poughkeepsie included rehabilitation of three street car lines and bus substitution on two others

In addition to the service on Main Street, the Poughkeepsie & Wappingers Falls Railway operates two additional street car routes in the northern section of the city, the North Side line and the Hospital line. The North Side line operates in a clockwise direction on a loop including a part of Main Street, Washington Street, Parker Avenue, North Street, North Clinton Street, Cottage Street, Smith Street to Main Street. As shown on the accompanying map of the city, this line adequately serves the residential section to the north of Main Street. Birney cars are operated on this line on a twenty-minute headway until 8 a.m., a ten-minute headway to 8:10 p.m. and a twenty-minute headway until 11 p.m. Two cars are used for the ten-minute headway, and one car is used to operate a twenty-minute schedule. The Hospital line operates from the intersection of Main and Washington Streets over the same route as the North Side line as far as the intersection of Garden Street and Parker Avenue, where it branches to the north and extends 1½ miles beyond the city limits to the Hudson River State Hospital. These routes are built with single track with the exception of that portion of the route that is common to both lines on Washington Street and Parker Avenue, which has double tracks. The lines are not co-ordinated in any way, the Hospital line using one Birney car running on a half-hourly service throughout the day, and the North

Gross Income in Cents Per Car or Bus-Mile, 1925-1929

	1925	1926	1927	1928	1929
Main Street	49.17	49.19	49.09	47.06	47.12
North Side	24.21	25.46	26.28	26.74	28.74
Hospital	34.14	34.80	32.37	33.33	33.97
South Side	28.90	27.57	26.10	29.18	31.52
Wappingers Falls	32.10	32.65	31.11	29.31	27.48
Average	37.88	39.04	38.45	38.11	38.37

Digitized by Google

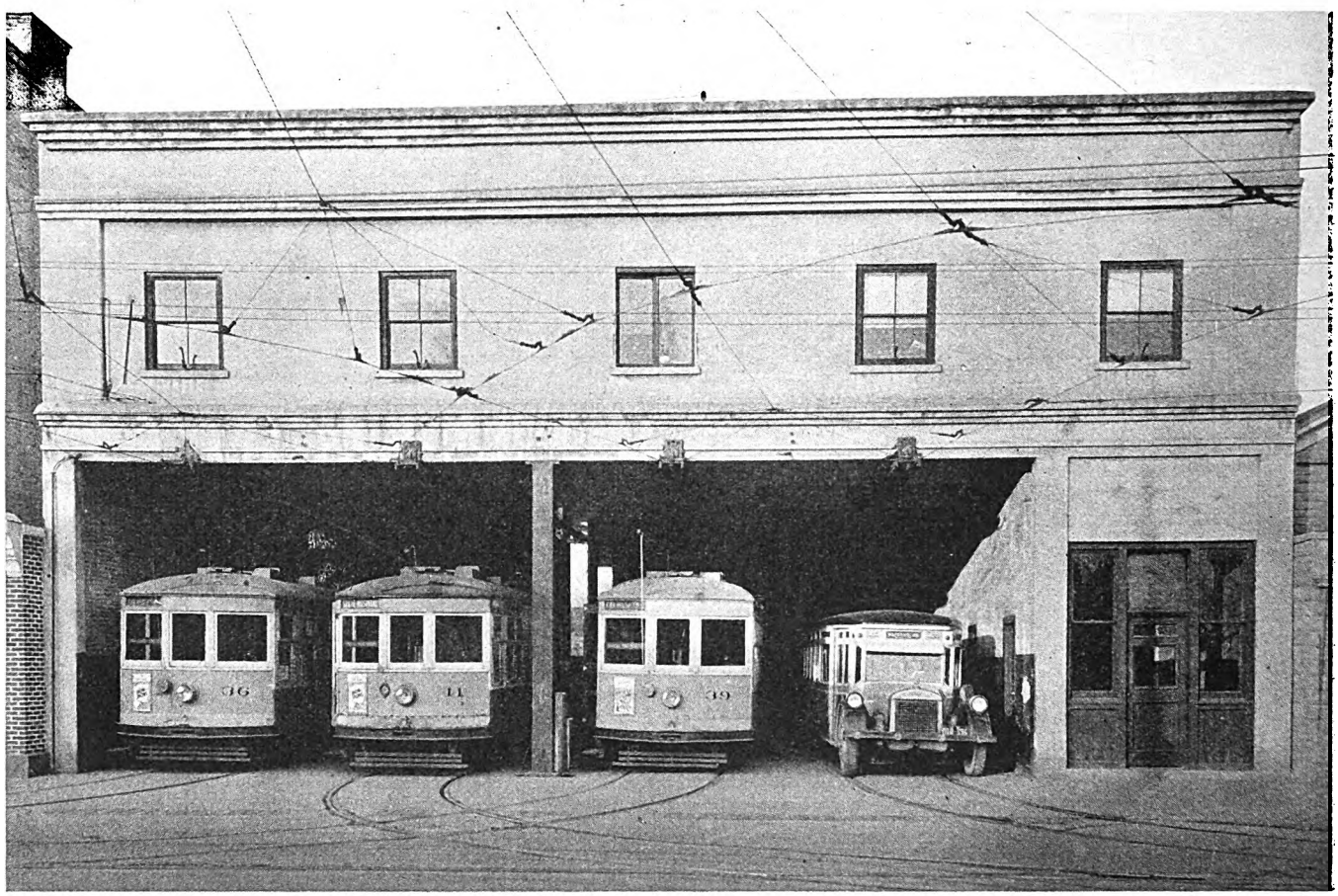
Earnings and Expenses of Poughkeepsie System, 1925-1929

	1925	1926	1927	1928	1929
Gross revenue	$262,118	$269,384	$263,853	$252,367	$256,740
Operating expenses and taxes	188,120	191,227	172,755	158,362	164,052
Net revenue	$73,998	$78,157	$91,098	$94,005	$92,688
Interest charges and depreciation	109,662	109,108	106,671	106,308	89,263
Net income (*deficit*)	*$35,664*	*$30,951*	*$15,573*	*$12,303*	$3,425

Side line operating on a schedule as previously described. Service on the Hospital line, previous to the term of the present management, was rendered by heavy type cars, with two-man operation. Birney cars replaced the old cars on this line and one-man operation was put into effect. This change was one of the major economies effected by the new management.

Introduction of bus service was first made on Oct. 10, 1928, by the substitution of buses for street cars on the South Side line, shown on the accompanying map. A portion of the route on this loop was in need of repaving and it became necessary for the company to make a decision between a large expenditure for its share of this work or the substitution of buses for cars. Bus service was decided on after a careful study of the operating costs of such vehicles and the sentiment of the residents on the south side of the city. At the present time, two A.C.F. 23-passenger buses operate in both directions on this loop, maintaining a fifteen-minute headway throughout the day. The operation of modern, comfortable buses over this new pavement has proved very satisfactory from both company and customer standpoints. Since its inauguration, patronage has constantly increased. From a gross income of 26.10 cents per car-mile in 1927, the same route produced 31.52 cents per bus-mile in 1929.

In addition to the local services described, the Poughkeepsie & Wappingers Falls Railway operates an interurban bus line between the business section of the city of Poughkeepsie and the town of Wappingers Falls, located 8 miles to the south. One and one-half miles of this route is located within the city of Poughkeepsie itself and the remainder of the route is on the Post Road, which will be rebuilt in 1930. Previous to November, 1928, service on this route was carried on by light-weight, double-truck interurban cars which were doing a good business and holding patronage. The substitution of buses for this street car service was deemed desirable because a great portion of the route was included in a state highway paving program. The right-of-way from Poughkeepsie to Wappingers Falls laid adjacent to the South Post Road, which was to be widened and repaved for the new highway. From the state's standpoint, it was more desirable to acquire the private right-of-way than property on the other side of the road, since the street car line was at approximately the proper grade for the new road and was cleared of all obstructions such as trees, embankments and the like. Furthermore, acquiring this strip of land would relieve the state from the necessary condemnation proceedings of properties on the opposite side of the road. Consequently it seemed to be good business on the part of the Poughkeepsie & Wappingers Falls Railway to sell this right-of-way to be included in the new highway. The proceeds from the sale of this land materially affected the financial status of the company,



General offices, carhouse and garage are grouped in one building, centrally located on Main Street

Digitized by Google

Operating and Traffic Statistics, Poughkeepsie System, 1927-1929

	1927			1928			1929		
	Cars	Buses	Cars and Buses	Cars	Buses	Cars and Buses	Cars	Buses	Cars and Buses
Total vehicle-miles	530,577	42,842	573,419	497,110	51,687	548,797	386,687	169,326	556,013
Passengers									
Revenue	2,153,998	128,768	2,282,766	1,998,859	176,815	2,175,674	1,651,768	545,195	2,196,963
Transfer and free	194,971	16,332	211,303	178,014	20,112	198,126	138,106	44,624	182,730
Total	2,348,969	145,100	2,494,069	2,176,873	196,927	2,373,800	1,789,874	589,819	2,379,693
Cents per vehicle-mile									
Gross revenue	38.88	28.91	38.13	38.75	32.71	38.18	41.88	29.26	38.04
Operating expenses	23.16	22.40	23.10	22.33	20.57	22.16	24.90	17.14	22.54
Net revenue	15.72	6.51	15.03	16.42	12.14	16.02	16.98	12.12	15.50
Cents per revenue passenger									
Gross revenue	9.58	9.62	9.58	9.64	9.56	9.63	9.80	9.09	9.63
Operating expenses	5.70	7.45	5.80	5.55	6.01	5.59	5.83	5.32	5.70
Net revenue	3.88	2.17	3.78	4.09	3.55	4.04	3.97	3.77	3.93

as the money was used immediately to retire all paving claims held by the city of Poughkeepsie for its previous repaving of Main Street. At the present time, semi-de luxe, 29-passenger A.C.F. buses are used on this line and operate on a time-table schedule averaging a trip about every 40 minutes each way throughout the day. The through fare on this line is 30 cents cash, or 25 cents if tokens are purchased. Weekly commutation tickets of six round trips cost $1.75; school tickets of 50 trips may be purchased for $6; monthly half-way tickets from Poughkeepsie with 26 round trips are sold for $5.20; as well as half-way school tickets of 100 trips for $6. The gradual increase in riding on this line has been steady since the introduction of bus service.

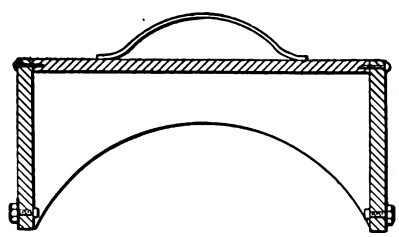
Careful study of the operating statistics and revenue tables included with this article will show a material improvement in the operating and financial structure of the company within the past few years. Most notable are the reductions in operating expenses and interest charges. The operating expenses were reduced principally in the following way: by taking off the heavier two-man cars on the Hospital line and the substitution of light-weight Birney cars with one-man operation; abandonment of a considerable amount of track and overhead and the reduction of maintenance forces; rearrangement in the office personnel and the saving of energy required due to the abandonment of heavy cars for lighter units. An unusual economy, effected at the time of bus substitution and the abandonment of track and line equipment, was the combination of garage and line forces. At the present time the garage force is trained in line maintenance and in an emergency is rushed out to take care of any breakdowns. The reduction in interest charges was the result of the sale of real estate on the Poughkeepsie & Wappingers Falls line and the paying of old paving debts from the money derived from this sale.

Within the past few years particular attention has been paid to accidents and their reduction, resulting in further economies of operation. A safety contest was started in the latter part of 1927. The crews are divided into four teams, each headed by a captain elected by the operators. The captains choose their men for the teams, which serve together for one contest period covering three months. At the first of each month a meeting is held by the captains and the manager, and every accident for the previous month is analyzed. If the accident is found to be the fault of the operator, it is charged against him and his team. At the end of the contest period a prize is awarded to the winning team, and a smaller prize to the operators on the losing teams with a "no chargeable accident" record. There is very keen competition for these prizes among the men, and the safety program has materially helped to reduce the number of accidents to a minimum. For the last fifteen years the annual average cost of accidents, including legal expenses, has been in excess of $5,000, whereas the cost for 1928 was $3,442 and in 1929 $3,075, so that in spite of the increasing number of automobiles operating over the narrow streets in Poughkeepsie, the company has been able to reduce the annual accident expenses during the last two years. The company has accrued, since 1912, 2 per cent of its gross income for accident claims.

With the present street car lines and two bus routes, the Poughkeepsie & Wappingers Falls Railway is efficiently furnishing adequate transportation in Poughkeepsie. The substitutions thus far made have strengthened the economic and operating conditions of the company, with the result that the system is operating on a profitable basis that seems likely to continue. What will become of the existing car lines when reconstruction becomes necessary in the distant future is not yet determined. Further substitution of buses could be effected without any appreciable change in riding habits or service, as bus capacities are comparable to the size of street cars now being used. With rolling stock, track and overhead structures in good condition on the car lines and comparatively new equipment on the bus lines, operations are stabilized for at least ten years.

Adjustable Commutator Sander

FOR sanding commutators of various sizes, the device shown in the accompanying illustration has many advantages. A holder is built up of three pieces of wood and a strip of sandpaper is fastened between its two ends with bolts as shown. The arrangement allows the sandpaper to adjust itself to the curvature of the commutator regardless of the diameter. When the device is pressed



Sandpaper stretched between the flexible ends of this holder adjusts itself to the surface of commutators of different sizes and bears evenly over the entire surface

against the commutator, the sanding action takes place over a much wider area than is possible with a solid block, and in the latter it is impossible to make the sandpaper bear evenly over the entire area. There are no hard spots to score the commutator as there may be when the solid block is used, and a satisfactory surface will be produced much more quickly.

Digitized by Google

Air-Magnetic Brakes Make Quick Stops

Combination of electric track brakes with standard air brakes reduces time and distance for making emergency stops as much as one-third

By H. A. Davis

Air Brake Engineering Department General Electric Company

MAGNETIC brakes of all types heretofore used can be classified in three general groups: (1) The solenoid brake, in which the armature of a solenoid transmits pressure to brakeshoes on the wheels; (2) the disk brake, in which a disk keyed to the axle is retarded by a stationary disk magnetically attracted to it; (3) the track brake, in which the shoes are electromagnets acting on the track rails and are mechanically connected to brakeshoes through a system of levers. Almost always, with each of the three forms, the current for energizing the magnet coils has been supplied by the car motors acting as generators. This has necessitated railway motors approximately 25 per cent larger than would otherwise be required and, usually, a special controller.

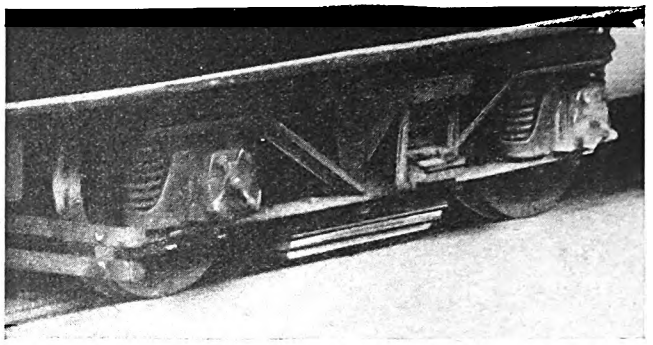
Recently a magnetic track-brake equipment has been perfected which consists of electromagnetic track brakeshoes, energized by trolley current and used in conjunction with and to augment standard air brakes. On a double-truck car, four, and on a single-truck car, two, electric shoe brakes are spring suspended, normally clear of the rails. When a magnetic brake application is desired they are set on the rails by means of small air cylinders. There is no mechanical connection between the electric shoe brakes and the wheel brake, and the air control for the shoe brakes is separate. It is assumed that the air brake will operate at full efficiency and the magnetic braking is additional to the best that can be obtained with air brakes alone. When the magnetic brake is applied, no weight is taken off the car wheels, so that the air brake is in no way impaired.

There are two distinct kinds of magnetic brake application. One is automatic and is made by an emergency application of the air brakes. The other is under the control of the operator and is for service stops. The control is so arranged that the magnets cannot stay energized indefinitely after either class of application, but the time is automatically adjusted to last longer than the time required to make these stops. The magnetic brake will, however, release immediately upon the release of the air brake after either a service application or emergency application of both the air and magnetic brake.

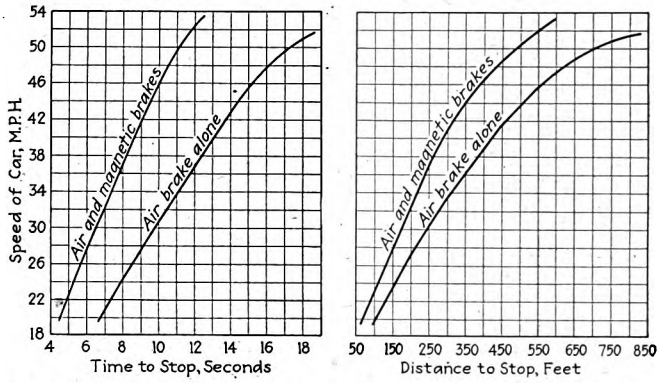
Magnetic track brake equipments of this type are now in operation on the following properties:

18 equipments—Buffalo & Erie Railway
41 equipments—Kentucky Traction & Terminal Company
3 equipments—Jamestown Street Railway
10 equipments—Indianapolis & Southeastern Railway
1 equipment—United Traction Company, Albany, N. Y.
1 equipment—United Railways & Electric Company, Baltimore
1 equipment—Third Avenue Railway, New York.

The electric shoe brakes now being built are fully saturated at approximately 20 amp. As they are connected in series, whether on a double-truck or a single-truck car, the current drawn from the line for a magnetic brake application is limited approximately to that value. The accompanying curves show the average result of tests comparing stops made with air and magnetic brakes with stops made with the air brakes alone. All the stops plotted were made by emergency applications.

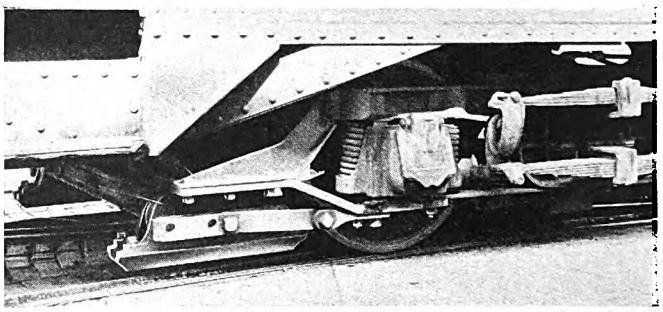


Installation of magnetic brakes between the wheels of a double truck, as used on the new Albany car



Comparison of Average Results in Stopping with Air and Air-Magnetic Track Brakes

At left, relation of speed and time; at right, relation of speed and distance. The results were obtained in 28 emergency stops, 14 with air brakes alone and 14 with air and magnetic brakes. The tests were made on the Buffalo & Erie Railway on one of its double-truck cars equipped with standard air brake and safety car control equipment as well as with electric shoe brakes.



Installation of electric shoe brakes on one of the cars of the Buffalo & Erie Railway, of the type tested

Magnetic track brake equipments as described have the following advantageous characteristics:

1. Stopping time and distance are materially decreased. Companies using them have had a very satisfactory reduction in the cost of accidents.

2. As the current for energizing the electric shoe brakes is taken from the trolley, wheel sliding does not affect the efficiency of the magnetic brake. On the contrary, it is very beneficial on a slippery rail. Users have reported a decided decrease in the amount of sand used since magnetic brakes were installed.

3. The confidence of the operator is such that although he may not find it necessary to use the magnetic brake for the majority of service stops, he will know that it is available when necessary. He therefore will follow traffic much closer and take more nearly full advantage of the acceleration at his disposal than he would if his car were equipped with air brakes only.

Digitized by Google

Attaining Faster Schedules

in Rapid Transit Service

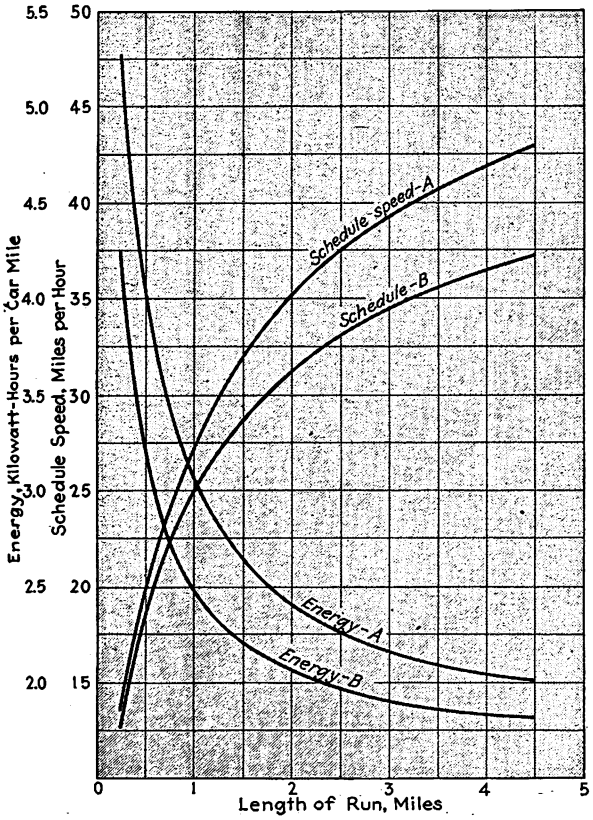


Fig. 1—Relation Between Energy Consumption, Schedule Speed and Length of Run

	Curve A	Curve B
Balancing speed with empty car on level tangent track, 600 volts, m.p.h.	60	50
Weight of loaded car, lb.	80,000	78,000
Number of motors	2	2
Rating of each motor, hp.	190	140
Rate of acceleration, m.p.h.p.s.	1.75	1.75
Rate of braking, m.p.h.p.s.	2.0	2.0
Wheel diameter, in.	32	32
Average line volts	575	575
Grade resistance, lb. per ton	2	2
Speed margin, per cent	5	5
Length of stops, seconds	20	20

Subway train resistance formula used.

HIGHER schedule speeds are desirable on rapid transit lines if this means of transportation is to retain its leading position as a means of travel in metropolitan centers. Many lines are now working at capacity during rush hours and still are unable to provide adequate service. An increase in schedule speed permits the use of fewer trains for a given service, increasing the efficiency of operation and offering a means of reducing expenses.

A number of factors affect schedules, but higher balancing speed, more rapid acceleration and braking rates and lower car weight are among the most important means of increasing speeds. Trolley voltage usually is fixed. Time of stops is not considered in this article.

Factors that influence the speed of trains are analyzed. Lower car weight and four-motor equipments have possibilities for increasing schedule speeds at no increase in operating cost

By

W. J. CLARDY

General Engineer

Westinghouse Electric & Manufacturing Company

The average length of run in subway or elevated operation is much greater than on surface lines, thus permitting the use of higher free running speeds. For a good many years rapid transit trains have been capable of maintaining balancing speeds 35 to 40 per cent higher than are encountered on surface lines. However, rapid transit cars are only 20 to 25 per cent faster than some of the surface cars recently brought out.

Naturally, it is just as feasible to use higher balancing speeds for rapid transit service.

An increase in speed requires more motor capacity and greater energy consumption, and it is well to consider the matter from the economic standpoint. Fig. 1 compares two subway equipments, one capable of maintaining a balancing speed of 50 m.p.h. on level tangent track at normal voltage, and the other 60 m.p.h. Schedule speeds and traction energy consumption are plotted for various lengths of run. For short runs energy consumption increases very rapidly with the balancing speed with a relatively small improvement in schedule speed.

In rapid transit service, it is impracticable to segregate cars used for local and express operation. This naturally leads to the selection of a compromise balancing speed in an effort to secure maximum operating economy for the combined service. A 0.5-mile run is representative of average local service. Comparison of the data in Fig. 1 indicates a schedule speed under the conditions stated of 18.5 m.p.h. for the 50-m.p.h. car as compared with 19.7 m.p.h. schedule for the 60-m.p.h. car, while the energy per car-mile increases from 3.24 to 4.01 kw.-hr. Thus 24 per cent more energy is required to obtain a 6.5 per cent greater schedule speed by the use of a higher maximum speed.

Express runs do not present a materially different picture. If an average of 1.25 miles is considered, which is typical for metropolitan rapid transit systems, the schedule speeds with the two equipments are 27 and 29.8 m.p.h. and the corresponding energy consumed per car-mile is 2.33 and 2.83 kw.-hr., respectively. Here 21.5 per cent more energy is required to realize a 10.3 per

Digitized by Google

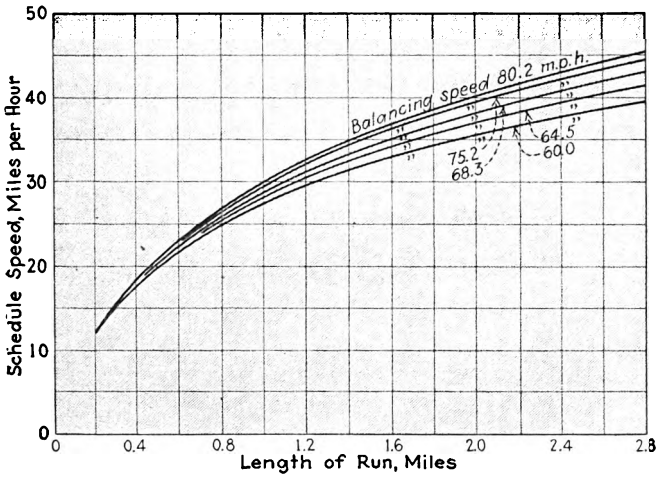


Fig. 2—Relation Between Schedule Speed, Balancing Speed and Length of Run, Three-Car Articulated Train

Weight of train, complete, lb.	243,000
Weight of passengers, rush-hour load, lb.	57,000
Total weight, lb.	300,000
Average wheel diameter, in.	35
Average volts at train	580
Equivalent grade and curve resistance, lb. per ton	3
Rate of acceleration, m.p.h.p.s.	2
Rate of braking, m.p.h.p.s.	2.25
Number of motors per train	6 or 8
Length of stop, seconds	25
Speed margin	No coast

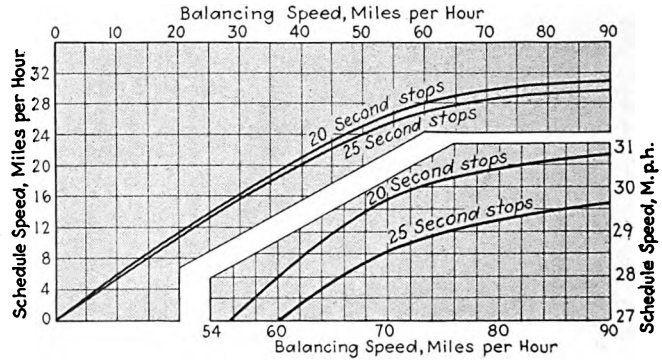
Train resistance for three 50-ton cars by Blood's formula modified

cent gain in schedule speed. With longer runs the handicap against the high speed equipment becomes less.

A further study of schedule and balancing speeds is shown graphically in Figs. 2, 3 and 4, which illustrate the possibilities of balancing speeds higher than 60 m.p.h. The relation between length of run, schedule speed and balancing speed is shown by Fig. 2. It is evident that little can be gained by operation with balancing speeds in excess of 60 m.p.h. for runs of a mile or less. When runs are as short as 0.5 mile, there is practically no difference in the schedule speeds which can be maintained.

Figs. 3 and 4 represent an analysis of a specific rapid transit service with runs ranging from 0.34 mile to 2.61 miles. The average length of run is 0.926 mile, but schedule speeds are figured on a basis of individual runs. The maximum schedule speed is almost reached with 60 m.p.h. balancing speed, Fig. 3, and there is practically no gain in schedule speed when using balancing speeds in excess of 70 m.p.h. Fig. 4 shows the upper portion of the curve in Fig. 3 on a larger scale.

An analysis of the economics of higher balancing speeds based on typical local and express rapid transit gives the results in Table I. There is a net increase in



Figs. 3 and 4—Relation Between Schedule Speed and Balancing Speed, Three-Car Articulated Train

(Fig. 4, lower right, is an enlargement of the upper portion of Fig. 3)

Weight of train, complete, lb.	243,000
Weight of passengers, rush-hour load, lb.	57,000
Total weight, lb.	300,000
Average wheel diameter, in.	35
Average volts at train	580
Equivalent grade and curve resistance, lb. per ton	3
Train resistance for three 50-ton cars by Blood's formula modified	
Rate of acceleration, m.p.h.p.s.	2
Rate of braking, m.p.h.p.s.	2.25
Number of motors per train	6 or 8
Speed margin	No coast
Average length of run, miles	0.926

Balancing speeds based on 600 volts, level tangent track, empty train and train resistance of 40-ton cars.

Table I—Comparison of Rapid Transit Equipments for Two Balancing Speeds

	Balancing Speed 50 M.P.H.		Balancing Speed 60 M.P.H.	
	Local	Express*	Local	Express*
Length of line, miles	10.00	12.00	10.00	12.00
Distance between stops, miles	0.5	1.25 / 0.50	0.5	1.25 / 0.50
Daily time of rush service, hours	4	4	4	4
Daily time of average service, hours	20	15	20	15
Headway in rush periods, minutes	2	2	2	2
Headway, average, minutes	6	5½	6	5½
Layover in rush periods, minutes	3	3	3	3
Schedule speed, m.p.h.	18.5	25.1	19.7	27.5
Car weight complete, lb.	70,000		72,000	
Average passenger load, lb.	8,000		8,000	
Total power per car (two motors), hp.	280		380	
Car-miles per year	30,750,000		30,750,000	
Car-hours per year	1,611,000		1,492,000	
Energy consumed per year, kw.-hr.	87,000,000		107,000,000	
Cost of platform labor per year, at 40 cents per car-hour	$644,400		$597,000	
Cost of propulsion energy per year, at 1.25 cents per kw.-hr.	$1,087,000		$1,337,000	
Total cost, labor and energy, per year	$1,731,400		$1,934,000	
Annual saving in energy and labor for 50 m.p.h. cars	$202,600		.....	
Number of cars required, with 5 per cent for rush-hour spares	563		521	
Additional investment in cars for 50 m.p.h. (563 at $35,000 and 521 at $36,400)	$741,000		.....	
Additional investment in substations and d.c. distribution system for 60 m.p.h. cars	.....		$280,000	
Net additional investment for 50 m.p.h. cars	$461,000		.....	
Annual fixed charges and maintenance on additional investment, at 15 per cent	$69,100		.....	
Annual increase in cost for energy, labor, fixed charges and maintenance, 60 m.p.h. cars	.....		$133,500	

*Express for 10 miles with 1.25-mile station spacing, local for 2 miles with 0.5-mile station spacing.

the annual total costs of energy, labor, fixed charges and maintenance amounting to $133,500 for equipment capable of maintaining 60 m.p.h. balancing speed as compared with the 50 m.p.h. equipment. This increase is entirely due to the traction energy requirements, since there is less expenditure for labor and fixed charges. The analysis illustrates the importance of energy costs in rapid transit service and indicates that runs must be quite long to make efficient use of high balancing speeds.

Higher accelerating and braking rates and weight reduction offer promising possibilities for schedule speed improvements with maximum operating economy, and already have been adopted by trolley car operators. In this connection there also has been a departure from conventional body and truck design in an effort to provide an attractive, economical vehicle.

Similar developments might well be considered for rapid transit. Higher accelerating and braking rates naturally are of less benefit than in frequent-stop city service but a material improvement can be expected for local rapid transit runs. Weight reduction makes a direct saving in the power bill and indirectly contributes to lower car, track and roadway maintenance costs. Body weight can be materially decreased by the use of aluminum alloys, but the most promising possibility is a departure from the conventional design of truck.

The need for higher acceleration has placed the two-motor equipment in the discard for surface cars. Adhesion on all axles is necessary to accelerate rapidly. Rapid transit lines have long used the two-motor equip-

Digitized by Google

Table II—Comparative Weights and Balancing Speeds, Single and Articulated Cars

Type of Car	Motors — Number	Motors — Rating, Hp.	Balancing Speed on Level	Weight Complete, Lb.
Single cars				
A—With light-weight body and modern motors	2	140	51	70,000
B—With light-weight body, high-speed motors and new-type trucks	4	75	51.5	63,000
Articulated cars				
C—Type now operated, three bodies on four trucks	4	210	46.5	208,000
D—With three light-weight bodies and modern motors on four trucks	4	160	48.5	175,000
E—With three light-weight bodies and high-speed motors on four new-type trucks	8	85	49	152,000

Table III—Speeds and Energy Consumption of Cars of Table II in Local and Express Service

Type of Car	Local Run, 0.5 Mile — Schedule Speed, M.P.H.	Local Run, 0.5 Mile — Energy, Kw.-Hr. per Car-Mile	Express Run, 1.25 Mile — Schedule Speed, M.P.H.	Express Run, 1.25 Mile — Energy, Kw.-Hr. per Car-Mile
Single				
A	18.50	3.24	27.00	2.33
B	19.95	3.33	28.50	2.35
Articulated				
C	17.30	8.45	24.80	6.29
D	17.60	7.34	25.20	5.44
E	19.10	7.65	26.90	5.56

ment, which has real advantages with respect to first cost, efficiency and maintenance. However, four smaller motors will improve acceleration and give the space necessary to permit a change from the conventional truck design. The four-motor equipment offers the advantages of better adhesion, higher accelerating rates, reduced

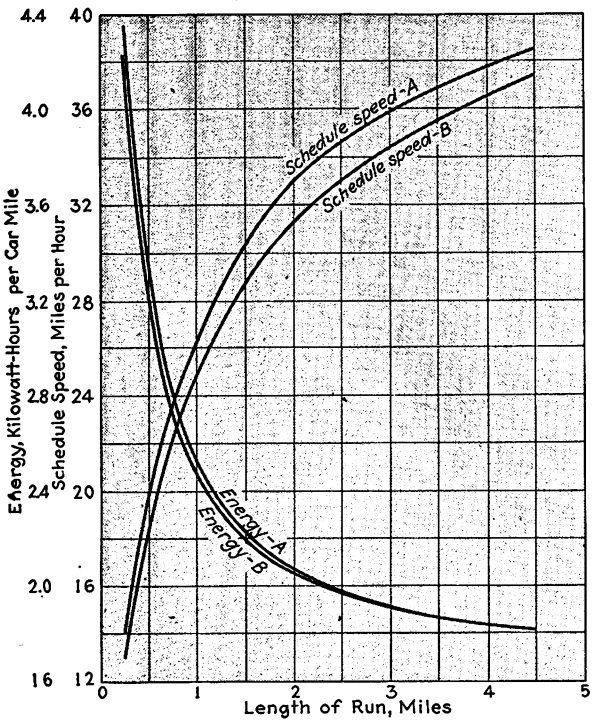


Fig. 5—Relation Between Schedule Speed, Energy Consumption and Length of Run, Single Cars

	Curve A	Curve B
Passenger load, lb	8,000	8,000
Average line volts	575	575
Grade resistance, lb. per ton	2	2
Speed margin, per cent	5	5
Length of stop, seconds	20	20
Motors per car	4	2
Horsepower per motor	75	140
Weight of car, empty, lb	63,000	70,000
Rate of acceleration, m.p.h.p.s	2.5	1.75
Rate of braking, m.p.h.p.s	2.5	2
Subway train resistance formula used		

truck weight, lower track and roadway maintenance costs and less power cut out per train in case of failure. Higher schedule speeds are possible with little change in equipment operating costs, or the same schedule speed can be maintained with a substantial reduction in the power bill. A change to the four-motor equipment, such as has been made on surface systems, might prove beneficial and should be fully considered for future rapid transit operation.

A comparison of the weights of single cars and three-car articulated units with large motors and small modern high-speed motors and an improved truck design is given

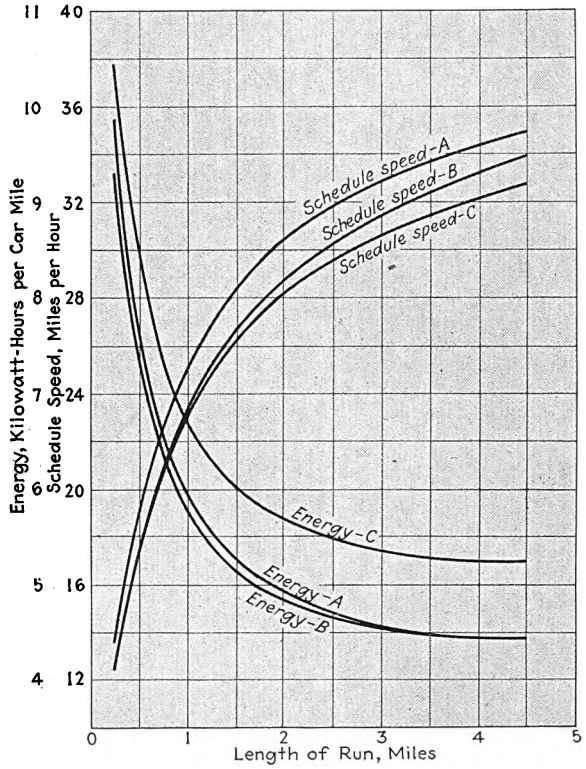


Fig. 6—Relation Between Schedule Speed, Energy Consumption and Length of Run, Articulated Cars (Three Bodies)

	Curve A	Curve B	Curve C
Passenger load, lb	16,800	16,800	16,800
Average line volts	550	550	550
Grade resistance, lb. per ton	5.25	5.25	5.25
Speed margin, per cent	5	5	5
Length of stop, seconds	20	20	20
Number of motors	8	4	4
Rating of each motor, hp	85	160	210
Weight of unit, empty, lb	152,000	175,000	208,000
Rate of acceleration, m.p.h.p.s	2.5	1.6	1.6
Rate of braking, m.p.h.p.s	2.5	1.75	1.75
Subway train resistance formula used			

in Table II. It shows the possibilities of weight reduction by this means.

In making a comparison of standard equipments with those proposed using double the present number of motors per car in rapid transit service, two of the important items of operating costs, power and labor, can be readily determined. The performance of the various equipments is shown by Figs. 5 and 6, which give the relation between length of run, schedule speed and traction energy consumption. The group of curves in Fig. 5 are for single cars, while those in Fig. 6 are for articulated cars. The data give a comparative measure of the results with different accelerating and braking rates, car weights and efficiencies.

The high-speed equipments using double the number of motors per car can make a much better schedule speed

Digitized by Google

Table IV—Comparison of Standard Two-Motor Equipments with Light-Weight High-Speed Four-Motor Equipments

	Two Standard 140-Hp. Motors per Car		Four High-Speed 75-Hp. Motors per Car	
	Local	Express*	Local	Express*
Length of line, miles	10.00	12.00	10.00	12.00
Distance between stops, miles	0.5	1.25 / 0.5	0.5	1.25 / 0.5
Daily time of rush service, hours	4	4	4	4
Daily time of average service, hours	20	15	20	15
Headway in rush periods, minutes	2	2	2	2
Headway, average, minutes	6	5½	6	5½
Layover in rush periods, minutes	3	3	3	3
Schedule speed, m.p.h.	18.45	25.1	19.95	26.65
Car weight complete, lb.	70,000		63,000	
Average passenger load, lb.	8,000		8,000	
Rate of acceleration, m.p.h.p.s.	1.75		2.5	
Rate of braking, m.p.h.p.s.	2.0		2.5	
Balancing speed on tangent track, m.p.h.	51.0		51.5	
Car-miles per year	30,750,000		30,750,000	
Car-hours per year	1,611,000		1,528,000	
Energy consumed per year, kw.-hr.	87,000,000		88,900,000	
Cost of platform labor per year, at 40 cents per car-hour	$644,400		$611,000	
Cost of propulsion energy per year, at 1.25 cents per kw.-hr.	$1,087,000		$1,111,000	
Total cost, labor and energy, per year	$1,731,400		$1,722,000	
Number of cars required, with 5 per cent for rush-hour spares	563		529	
Price per car	$35,000		$36,500	
Total investment in cars	$19,700,000		$19,300,000	
Annual fixed charges and maintenance on cars, at 15 per cent	$2,955,000		$2,895,000	
Annual cost of labor, energy, fixed charges and maintenance	$4,686,400		$4,617,000	

*Express for 10 miles with 1.25-mile station spacing, local for 2 miles with 0.5-mile station spacing.

with little change in traction energy consumption, regardless of lower motor efficiency and the greater energy requirements of the higher schedule speed. This is due to the saving effected in car weight. The figures for typical local and express runs are given in Table III.

A study of the economic advantages of using light-weight equipment capable of improved schedule speeds has been made. Typical local and express rapid transit service operated with trains of single cars is considered as a basis for the analysis, as given in Table IV.

The data show an annual net saving (labor, power, fixed charges and maintenance on additional investment) of $69,400 in favor of the light-weight equipment using high-speed motors. Labor cost is reduced, energy cost is slightly greater and the fixed charges are decreased due to lower investment required.

Other benefits which will be realized by the use of four-motor equipments on light-weight rapid transit cars are difficult to evaluate and have not been considered. A more complete analysis of the possible economies on the part of operators will provide a comprehensive picture of the results which can be obtained. However, the important items considered indicate the possibilities of developments to reduce car weight in an effort to obtain higher schedule speeds without an increase in operating expenses.

New Locomotives Facilitate Freight Handling

By Walter Silvus

Superintendent of Motive Power Texas Electric Railway, Dallas, Tex.

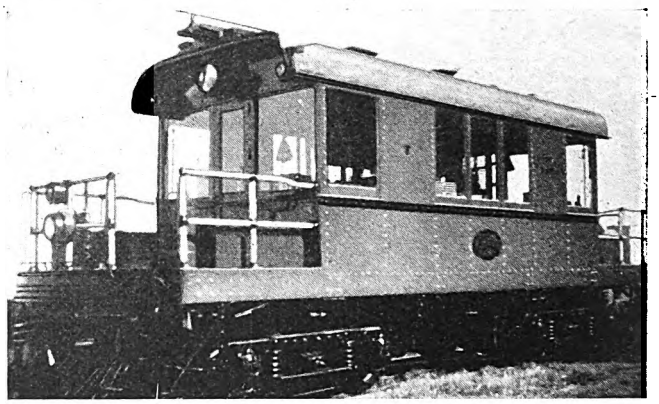
FREIGHT handling on the Texas Electric Railway has been greatly facilitated by the construction of three electric locomotives which have been designed and built by the company at its Monroe shops. The last one has recently been completed and put in service on the 76-mile Dallas-Denison division. It is planned to build two additional units this year, one for the Dallas-Denison division and one for the Dallas-Corsicana division, to take care of the increasing freight business.

Each locomotive weighs 50 tons and is 34 ft. over bumpers. The cab is 19 ft. long, the width over sheathing 9 ft., and the height from rail to top of trolley base 14 ft. 2 in. Two swiveling trucks are used, spaced at 17 ft. 10 in. centers.

The longitudinal body members consist of four 10-in., 30-lb. I-beams and two 10-in., 25.3-lb. channels, supported by body bolsters of 1¼x12-in. soft steel plates with steel fillers. The bumpers are 1¼x10-in. soft steel secured to longitudinal members, with angles securely riveted, and with anti-climbers riveted to the outside faces. Both underframes and cab are securely tied and braced to stand the hardest kind of service. The body corner posts are made of 3x3-in. angles, the intermediate posts and carlins of 3x3-in. tees and the side and end plates of 3x3½-in. angles.

The roof and side sheets are 12 gage sheet steel riveted to posts and carlins. The metal roof is covered with felt roofing paper, cemented to prevent slipping, and this in turn is covered with No. 8 duck, held by 1¼-in. half-oval steel beads at the sides. Large windows in the front and sliding windows in the sides give a good view in all directions. The front sash has waterproof ventilators and hand-operated window wipers.

The unit illustrated is mounted on Brill 27-MCB-3X trucks with 5x9-in. journals, and is powered by four GE-73-C motors. The controllers are Type K-64-D with LB-977 line switches and a DH-124 commutating switch for placing all four motors in series. The air brakes are Westinghouse 14-EL supplied by two CP-28 air compressors suspended beneath the floor. All other equipment is within the cab and protected by wire screens. Ohio Brass Company Form 23 couplers are used. The lowest possible gear ratio was employed, the speed with all four motors in parallel being 20 m.p.h.



Three of these new 50-ton locomotives are being used for handling freight on the Texas Electric Railway

One circuit of lamps is located under the frame, one lamp being at each corner and one near the air compressors. One Golden Glow and one GE-D-15 headlamp is used at each end. Shop-made electric markers display white, red or green lights. Illuminated metal train number boxes are located at each end.

Digitized by Google

Flexible Progressive Signal System

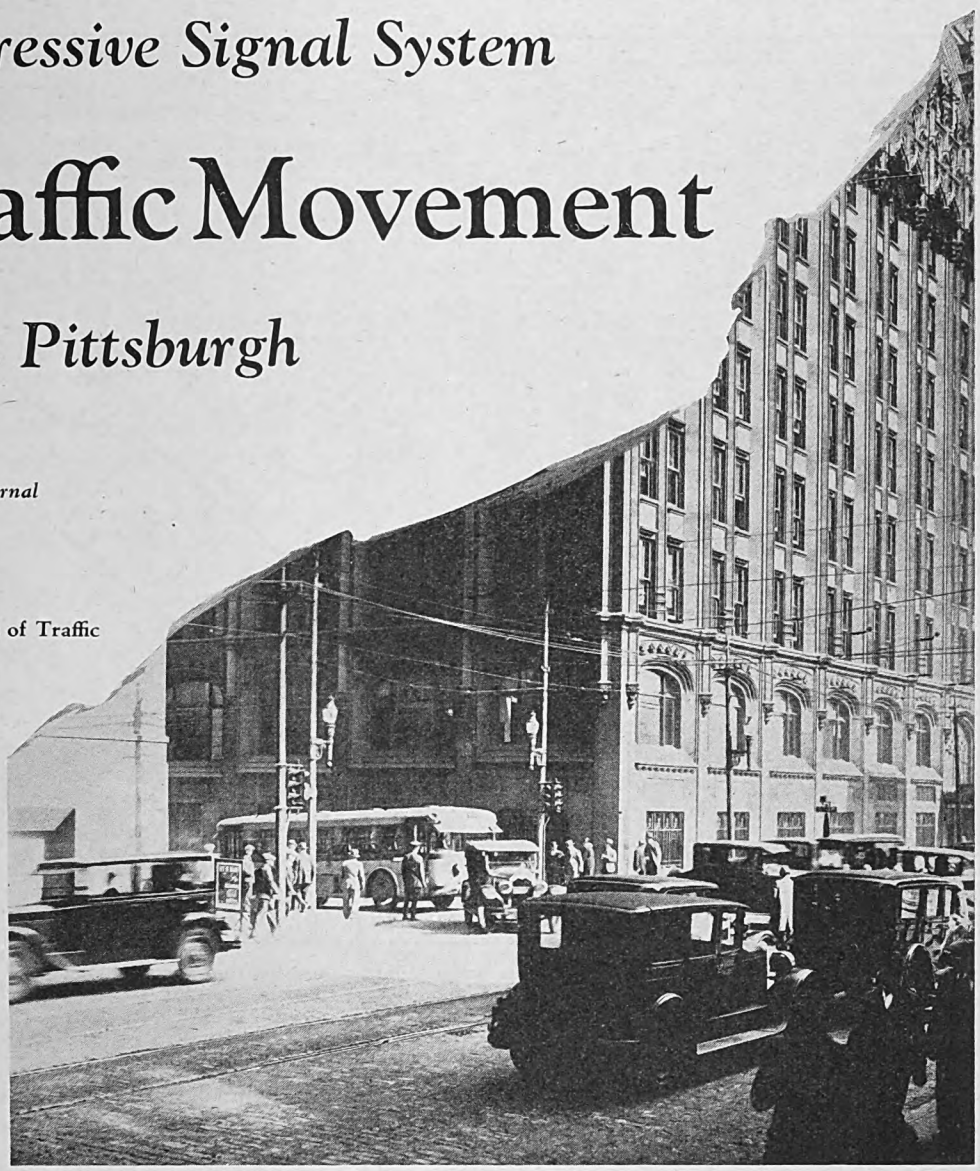
Aids Traffic Movement

in Downtown Pittsburgh

By J. R. Stauffer
Assistant Editor *Electric Railway Journal*

with co-operation of

Burton W. Marsh
Traffic Engineer in Charge of Bureau of Traffic Planning, City of Pittsburgh



Signal lights in downtown Pittsburgh are prominently located on all four corners of an intersection

IMMEDIATE improvement in every phase of traffic movement followed the installation of an automatic flexible progressive system of signal lights in downtown Pittsburgh. Vehicular speeds in heavy hours increased at once, and as automobile drivers and street car operators become more thoroughly accustomed to the system, and as other traffic improvements are made, further increases in speed will be possible. More than 20 per cent greater volume of traffic is now moving at a speed 22 per cent faster than was possible before electrical control was put in operation on June 12, 1929.

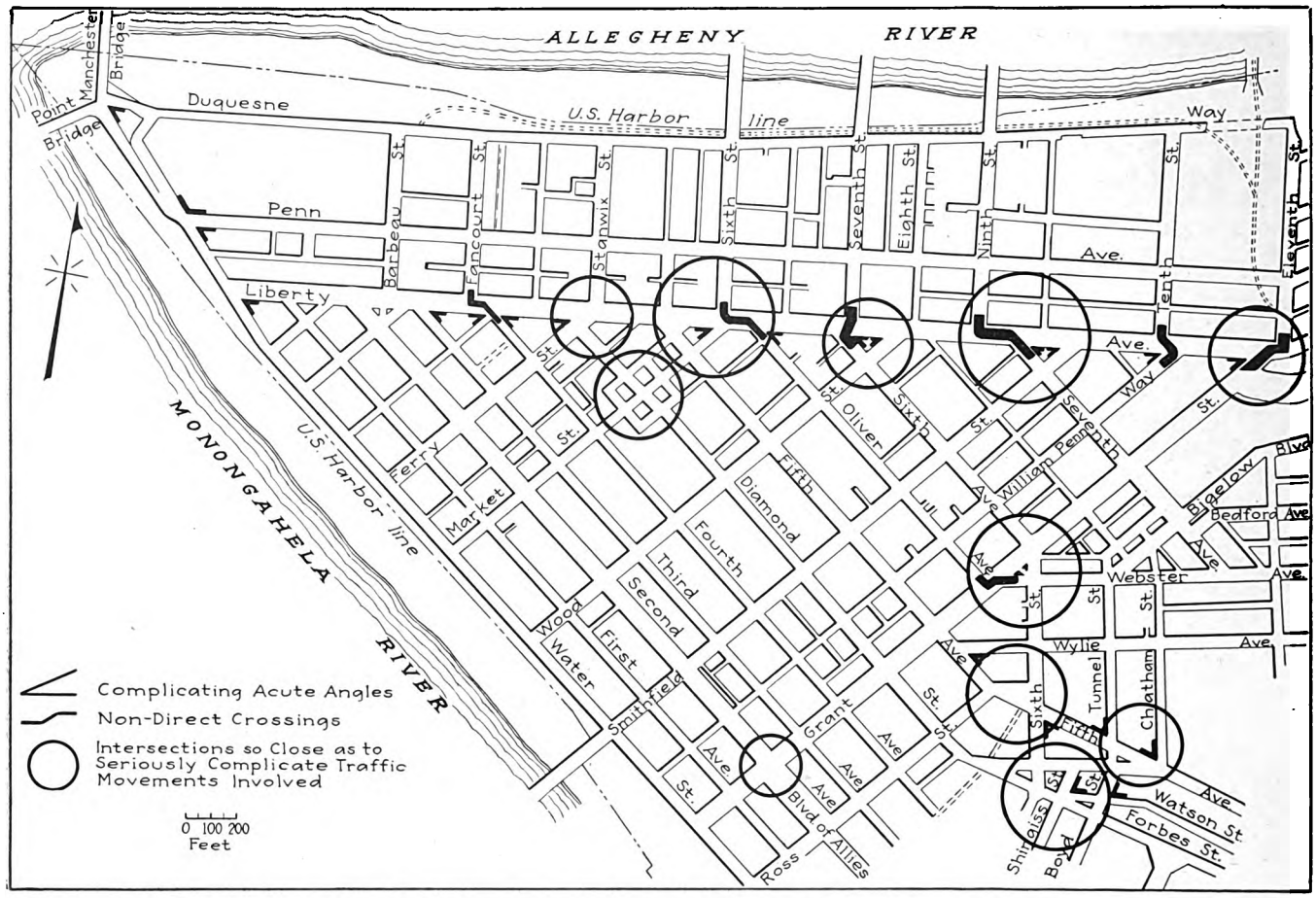
From the standpoint of the railway company, street car operation in the downtown area has benefited particularly because of the regularity with which cars can now negotiate the various loops. Street car speeds have increased between 5 and 10 per cent on these loops. Although the speeds of street car movement for which the street car co-ordination was designed have not yet been achieved, improvement is being made as the operators become more familiar with the signals.

The equipment for the signal system was specified from the findings of an extensive engineering survey of traffic conditions covering a period of 1½ years. For ten months careful studies were made of the signal systems and traffic control methods in a number of other cities in the country, and the remaining eight months were devoted to an intensive study of traffic conditions in the central business district of Pittsburgh and to the securing of basic data necessary for scientific co-ordination and timing of signals. The thoroughness of this survey was a primary factor in the excellent results which have been obtained during the past ten months. Since the signal system has been in operation, only a few minor changes in co-ordination and timing have been necessary.

More vehicles being moved at greater speed. Railway speed also increased but major benefit is regularity. District pedestrian advantages. Complete design of specifications for flexible progressive signal system developed by an extensive survey

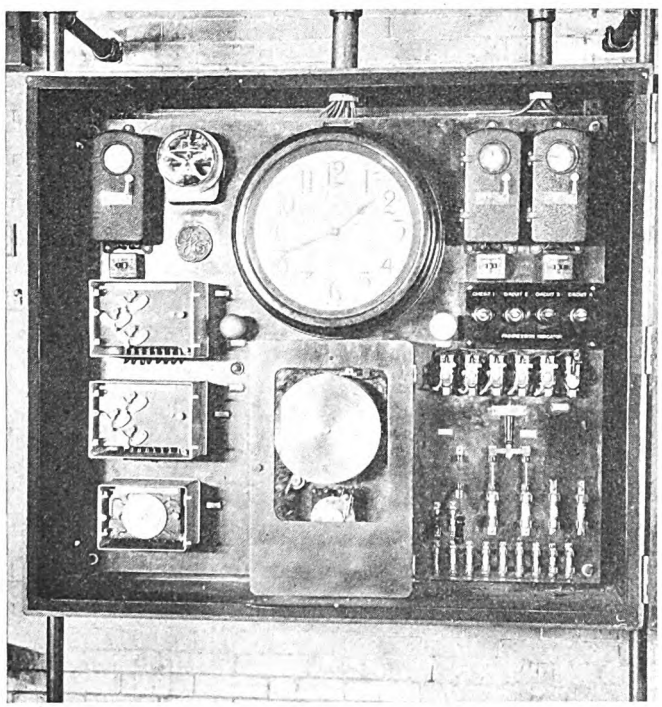
The type of signal control decided upon was the flexible progressive system. This system has many advantages over the other types. In fact, no other available system would have proved at all satisfactory in downtown Pittsburgh with its complex and irregular street layout, its varying but generally short block lengths, and its widely varying traffic demands on different streets. The flexible progres-

Digitized by Google



Pittsburgh's complex and irregular street layout demanded the most flexible system of electrical traffic control

sive system permits starting the main street "Go" interval at each intersection at just that part of the cycle when it will provide the best progressive movement. Furthermore, practically any desired percentages of the total cycle may be assigned to the two streets—and this cycle split may be varied with changing traffic requirements. The cycle length may be automatically varied—for example, made short to permit faster movement in light traffic hours, and longer to take account of the slower movement of peak-hour traffic. Also, once during each cycle, an automatic check-up insures that signals at all intersections are properly in step. These somewhat technical points are mentioned to emphasize the great degree of flexibility which this system embodies. These elements of flexibility are valuable tools to work with in achieving a maximum of efficiency. With the many complications encountered in downtown Pittsburgh, the lack of any of these tools would mean a most serious handicap in getting the best possible results.



The master control panel is located in the basement of the City-County Building

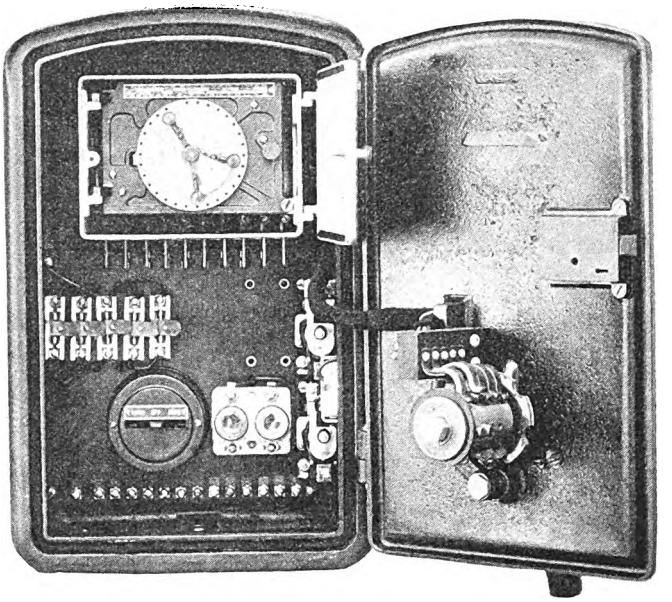
Brief Description of Equipment Used

The electrical equipment of this system, designed and constructed by the General Electric Company, consists of a master controller, local controllers at each intersection, with necessary interconnecting cable and the actual signal lights with their mountings. The master controller may best be described as a transmitter of electrical impulses, and the local controllers as receivers of such. The lights at any one intersection are operated by the local controller at that intersection, but the electrical impulses which actuate and govern the speed of the local controller are sent out by the master controller located in the City-County Building on Grant Street.

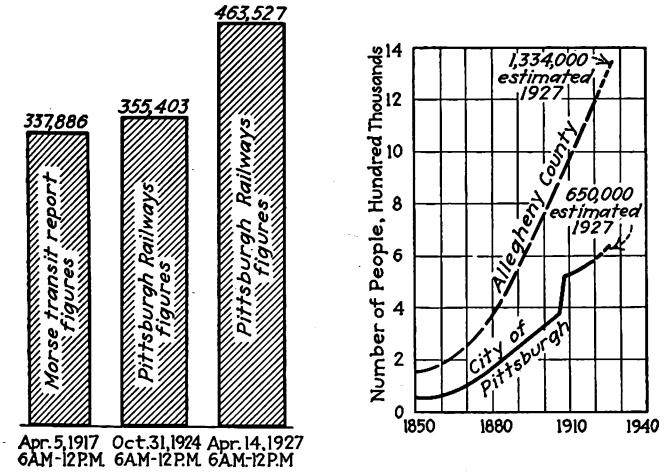
These impulses are not to be confused with the electric current actually used by the signal lights. This current is supplied locally at each intersection direct to the lights from the lines of the Duquesne Light Company.

Digitized by Google

The master control equipment mounted on a single panel in the basement of the City-County Building, consists primarily of a master impulse transmitter, automatic throw-over, secondary (or spare) master impulse transmitter, program clock governing cycle length changes automatically, trouble detectors, reset switch, a time clock to turn the system on in the morning and off at night, and sign circuit time clocks. The master controller consists of a simple induction disk type motor with three actuating coils, each of which causes the disk to operate at a different speed. Only one of these coils is driving the disk at one time. Each is set to rotate the disk at such a speed as to set up a specific cycle length for the system. For this particular system, one coil controls a cycle of 48 seconds, another of 50 seconds, and a third a cycle of 52 seconds. Changes from one coil to another are controlled by the program clock. If desired, any one of the coils may, by a simple lever movement, be made to produce a different cycle length. The duplicate, or spare, master impulse transmitter is put into service almost instantly by an automatic throw-over in case the regular impulse transmitter develops trouble.



A local controller is installed at each intersection and operates all lights at that point



Increase in street car riders, shown at left, and population growth, at right, were important factors in survey studies

When the secondary master impulse transmitter is put into service, a red lamp lights on the board to show the attendant that the primary master transmitter is out of order. As a matter of fact, the spare transmitter has not been brought into operation because of trouble except in a very few instances. Nevertheless, the spare is a valuable safeguard.

Impulses sent out by the master transmitter are transmitted through four sets of relays, each controlling a section of the central business district. Although the system as a whole is operated as one unit from the master controller, the four divisions are made for aiding in the location of trouble and for emergency operation of only certain sections. In case of a fire, a parade, or any trouble in one section of the city, that district alone can be cut out of operation and the remaining three sections will continue to operate normally.

Program Clock—One of the most interesting, as well as important, automatic features of the central control is the program clock. This clock consists of a series of disks calibrated for the time of day for each day of the week. On these wheels the cycle changes are set for each particular day. After the settings are all determined and made on this clock, the entire system of lights functions at its direction, the changes in cycle being made automatically. It is this clock which changes the operation from one coil to another on the master transmitter. If any further changes in cycles are desired at any time, they can be made manually by a resetting governing the particular coil then actuating the transmitter.

The program clock for normal operation in Pittsburgh at the present time is set for cycle changes as follows:

Monday, Tuesday, Wednesday, Thursday, Friday
8:00 a.m. to 8:45 a.m.—50 seconds
8:45 a.m. to 9:15 a.m.—52 seconds
9:15 a.m. to 11:45 a.m.—48 seconds
11:45 a.m. to 1:30 p.m.—52 seconds
1:30 p.m. to 4:00 p.m.—48 seconds
4:00 p.m. to 6:10 p.m.—52 seconds
6:10 p.m. to 8:00 p.m.—48 seconds
8:00 p.m. to 8:45 p.m.—50 seconds
8:45 p.m. to 10:30 p.m.—48 seconds
10:30 p.m. to 11:15 p.m.—50 seconds
11:15 p.m. to 12:00 midnight—48 seconds
Saturday: Same as weekday until 4 p.m.

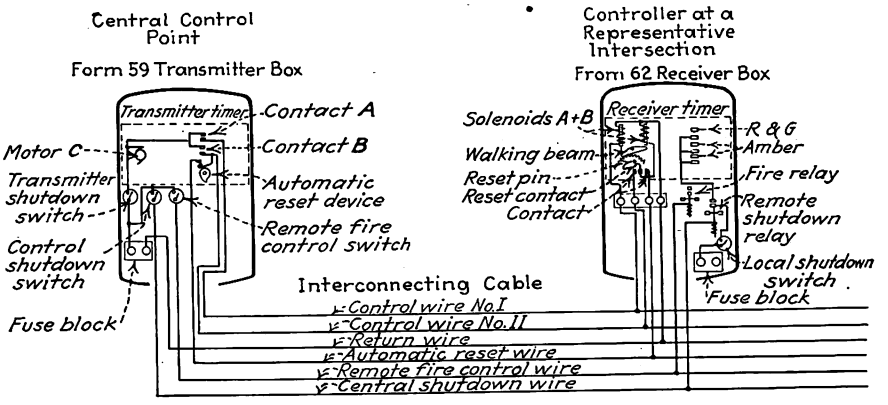
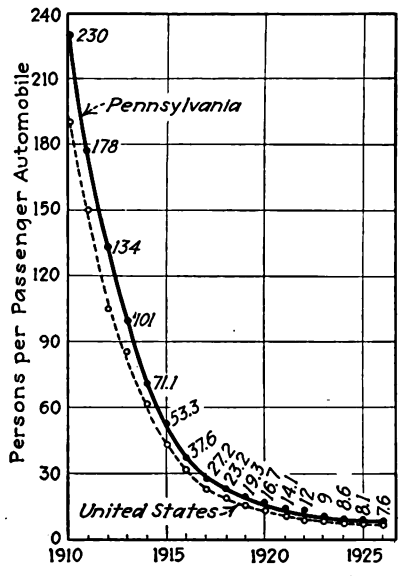
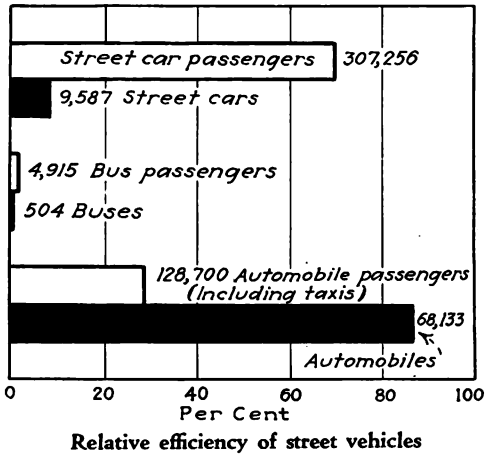


Diagram of wiring between master and local controllers

Digitized by Google

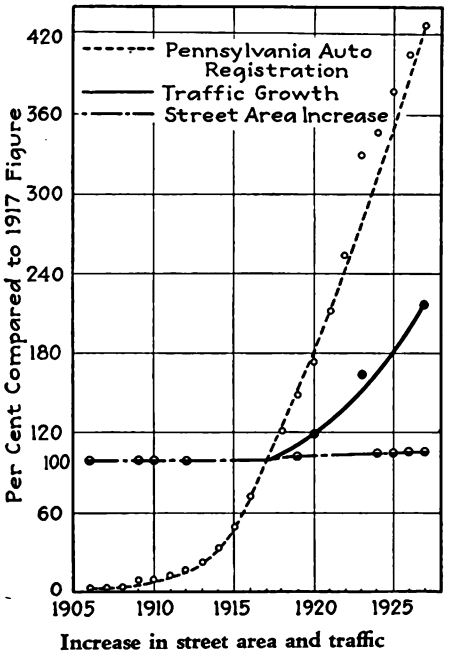


Increase in automobiles per capita



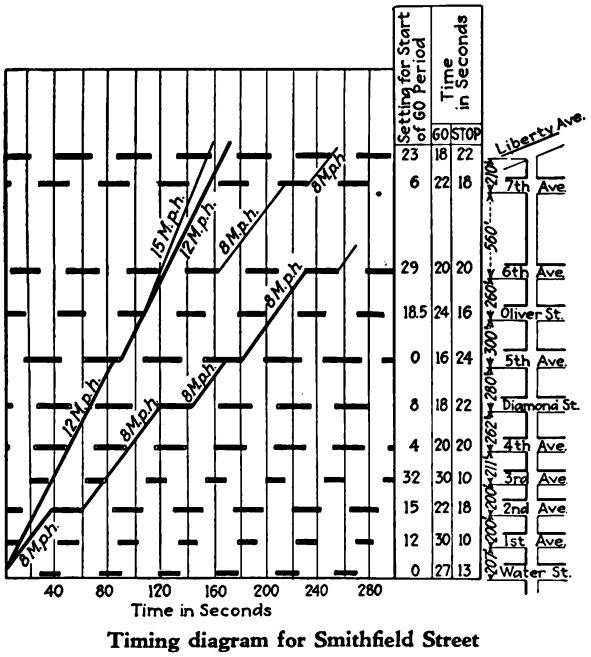
Relative efficiency of street vehicles

Typical complicated street intersection in downtown Pittsburgh



Increase in street area and traffic

The diagrams reproduced on this page are indicative of the thoroughness with which the many traffic studies were made



Timing diagram for Smithfield Street

4:00 p.m. to 8:45 p.m.—52 seconds
8:45 p.m. to 11:15 p.m.—50 seconds
11:15 p.m. to 12 midnight—48 seconds
Sunday: 48 seconds from 9 a.m. to 11:30 p.m.

On holidays a 50-second cycle is used all day. Greater variations in cycle length would be used were it not for the several complicated intersection groups which limit the permissible changes. Somewhat wider variations are now being tried out.

Trouble Detectors—On the master control board four trouble detectors in the form of small neon bulbs indicate when one or more local controllers in that section are out of step. Normally, when there is no trouble, each of these four neon bulbs flickers dimly with each impulse sent out, thus giving a positive signal that all is well. If one of these bulbs glows brightly, it is an indication of trouble in the corresponding section of the system. In case one of these neon lights goes out completely, the attendant knows that there is fuse trouble on the control board, and that the resynchronizing circuit is not operating properly.

Automatic Reset—This system also makes it possible to shift from one co-ordination arrangement to a second by merely throwing a switch. This is done through automatic reset apparatus. The automatic reset consists of a switch on the master control board which energizes a relay in all the local controllers at once. When the local reset relays are energized, changes in the relative start of the main green period, according to a predetermined set-up, are quickly and automatically effected. This secondary co-ordination affords the opportunity to set up a more advantageous co-ordination for the outward surge of traffic in the evening peak hours. This outbound surge, on some streets in particular, is such that a co-ordination considerably different from normal will bring greater efficiency in traffic movement throughout the system. While this secondary co-ordination has not as yet been generally used over the entire system, tests have been made on one of the main "free-wheel" arteries with satisfactory results. Further application of this reset co-ordination is being studied.

Control of Illuminated Signs—Two sign circuit time clocks complete the main equipment on the master control panel. These clocks will automatically control the operation of illuminated traffic signs which will be used throughout the central business district. These signs will indicate one-way streets, points at which left turns are not permitted, etc., and will be located on the signal light post directly under the signals themselves. These signs will be very prominent in this position because they will be at the point where all motorists' attention will be directed as they approach an intersection. One unique feature of certain of these signs—mainly those prohibiting left turns—is that when the sign is illuminated, the turn prohibition

Digitized by Google

will secure the attention of drivers, whereas when the regulation is no longer in effect a time clock will automatically cause the sign light to go out and the sign face will appear blank. Certain other signs, such as one-way street signs, will be illuminated and effective at all times.

Local Controllers—The mechanism known as the local controller, which actually governs the signal lights for an intersection, is placed on an existing pole or on a special signal post at each intersection. It consists essentially of two solenoids, alternately receiving impulses from the master transmitter, and operating a "walking beam" which rotates a toothed wheel at a controlled speed that determines the cycle length. On the face of this wheel are adjustable lever arms which, through cams, cause the various light changes at times selected to fit traffic requirements at that intersection. These times are adjustable on all lights, although the total length of cycle is constant at all intersections. Because of the simplicity and sturdiness of the local controller, relatively little trouble has arisen since their installation. The controllers are "jack mounted" so that they may be easily replaced in case of trouble. This feature also makes possible removal for periodical shop adjustment and oiling with a minimum interruption to signal operation at the intersection in question.

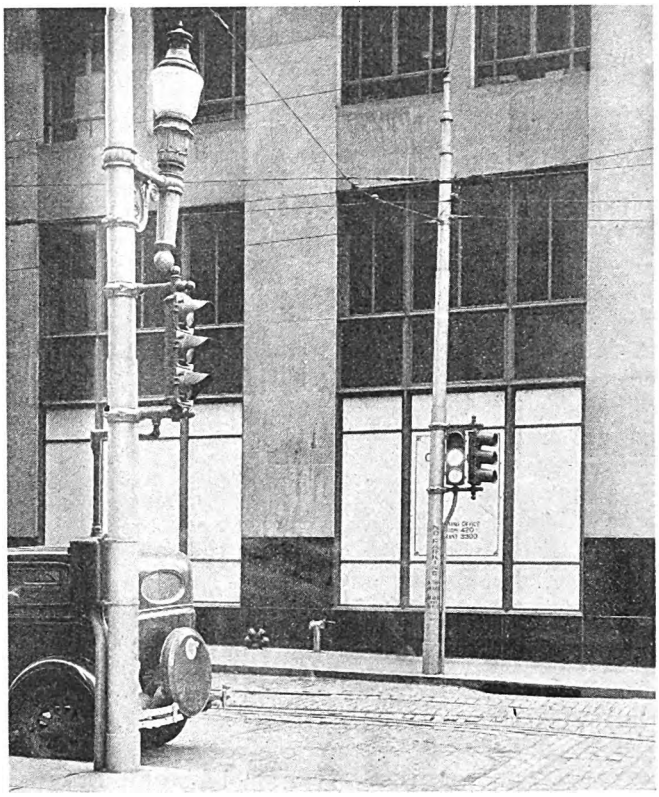
Modes of Transportation Used by Patrons and Employees of 48 Selected Stores in Entering the Central Business District, April 14, 1927

Mode	Patrons Number	Patrons Per Cent	Employees Number	Employees Per Cent	Total Number	Total Per Cent
Street car	39,477	62.5	6,435	70.3	45,912	63.6
Automobile	8,910	14.1	710	7.8	9,620	13.3
Train	7,677	12.1	1,309	14.3	8,986	12.4
Walk	4,465	7.1	558	6.1	5,023	7.0
Motor coach	2,552	4.1	140	1.5	2,692	3.7
Totals	63,081	100.0	9,152	100.0	72,233	100.0
COMPARISON BETWEEN CERTAIN MODES OF TRANSPORTATION						
Mass Transportation Units	49,706	84.8	7,884	91.7	57,590	85.7
Passenger auto	8,910	15.2	710	8.3	9,620	14.3
Totals	58,616	100.0	8,594	100.0	67,210	100.0
Pedestrians	4,465	8.0	558	7.1	5,023	7.7
Street-using vehicles	50,939	92.0	7,285	92.9	58,224	92.3
Totals	55,404	100.0	7,843	100.0	63,247	100.0
Street-using vehicles	50,939	86.9	7,285	84.8	58,224	86.6
Off-street vehicles	7,677	13.1	1,309	15.2	8,986	13.4
Totals	58,616	100.0	8,594	100.0	67,210	100.0

THE PITTSBURGH CYCLE

The Pittsburgh cycle differs from that recommended in the Hoover model municipal traffic ordinance in that there is a short yellow period of about two to three seconds following the red light. The main reason that the Hoover committee recommended eliminating the yellow after the red was that experience had shown that, with conditions as they then existed, many vehicle drivers tended to start on the yellow, instead of waiting for their green light. However, it is believed that this trouble, to a considerable extent, grew out of an attempt to use the yellow light for many different purposes, and out of the wide variations in length of yellow which existed in different communities. The yellow light was used as a cautionary signal, as a full stop signal, as a left turning signal, and as an exclusively pedestrian period. From a construction point of view, it was also simpler and less expensive to make the yellow following the green and the yellow following the red of the same length. Hence, the red light was often followed by a long yellow period, the need for which the public could not understand. Under different uses, the length of the yellow interval varied from a second or two, to more than fifteen seconds. So much experimentation was going on concerning its use that the public became disgusted with it, and there was a strong tendency to disregard it.

In the Pittsburgh cycle, a two to three-second yellow following the red is retained. This gives an opportunity for street car operators to shut their doors, release the air pressure on the brakes and prepare to start. It also enables vehicle drivers to get into gear ready to start. In answer to the criticism that even under a short yellow there would be a certain amount of starting before the green light showed, it is certain that the short yellow reduces both the probability and the seriousness of this violation.



Double series of lights mounted on a single arm present a neat appearance

The now generally recognized function of the yellow light following the green is to act as an intersection-clearance interval. Both vehicles and pedestrians should be given a proper opportunity to clear the intersection before cross traffic starts. The time required for the average vehicle to clear the intersection of two four-lane streets, at the relatively slow downtown speeds, is about two to three seconds. On the other hand, the time required for the average pedestrian to clear the same intersection is about nine to ten seconds. If an intersection-clearance period of two to three seconds is used, a pedestrian starting at the last second of the green light would find himself about one-third across the roadway when cross traffic starts. Such a situation is obviously unfair to pedestrians. If, on the other hand, the intersection-clearance period is made nine to ten seconds long, to give sufficient time for pedestrians to clear an intersection, and if vehicles must stop during that longer period, a serious penalty is

Digitized by Google

imposed upon vehicular traffic, especially with short signal cycle lengths.

The Pittsburgh cycle gives the pedestrian the necessary clearance interval without penalizing vehicular movement. This is accomplished by informing the pedestrian of that instant during the green period when there is no longer time for him to walk across the street before cross traffic starts. The method of accomplishment is by bringing the yellow light on with the green, nine or ten seconds before the cross street gets its "Go" signal. This green and yellow combination continues for approximately seven seconds. The green light then disappears and the yellow light alone shows for two to three seconds—and then the cross street gets its "Go" signal. In use, the cycle is simpler than it sounds. Pedestrians walk only on the green when shown alone. Vehicles, on the other hand, move on the green-alone signal, and may continue to move on the green-yellow. The green-yellow interval, plus the yellow-alone interval, gives the pedestrian clearance time. The yellow-alone is the vehicle clearance interval.

Location of Signal Lights

In practically every case, signal lights are located on the far right-hand corners of an intersection. In a number of cases where pedestrian traffic is heavy, two sets of lights are mounted on one pole. In a few cases, auxiliary nearside lights are installed where signals at the far side may not be clearly visible to the approaching vehicle driver. At three points in the downtown section, where the street layout is complicated and does not lend itself to curb-mounted signals, pedestals located in the streets are used.

The preliminary survey considered having the Duquesne Light Company furnish all the equipment, making a rental charge per signal to the city. However, it was decided to be of greater advantage to have the city furnish the signals and control equipment and the Duquesne Light Company furnish all power, cables and connections. There was general agreement that the city should have direct control over the signals and control equipment, thus enabling the city to take advantage of improvements in design which might come with the passage of time without the necessity of negotiating with the power company.

Cost of the System

The cost of the complete installation was approximately $237,000. Equipment cost amounted to $70,000; engineering and personnel $21,000; new poles and relocation of old ones, $10,500; underground work, cables, conduit, labor, etc., $136,000. The cost per intersection was about $2,500.

Designing an electrical traffic control system for a district such as downtown Pittsburgh necessitated a very complete engineering study of street use and of all the factors having an influence upon the volume, speed, character and distribution of vehicles and pedestrians on the street. An extensive survey authorized by the Mayor and Council which covered a period of 1½ years was made under the general supervision of the Better Traffic Committee of the City of Pittsburgh. The survey subcommittee was under the chairmanship of John M. Rice, consulting engineer. A special survey staff, assisted by the Bureau of Traffic Planning, gathered and analyzed the facts, and prepared recommendations. Traffic Engineer Burton W. Marsh was director of the survey, and Prof. Lewis W. McIntyre, street traffic specialist, University of Pittsburgh, acted as technical adviser.

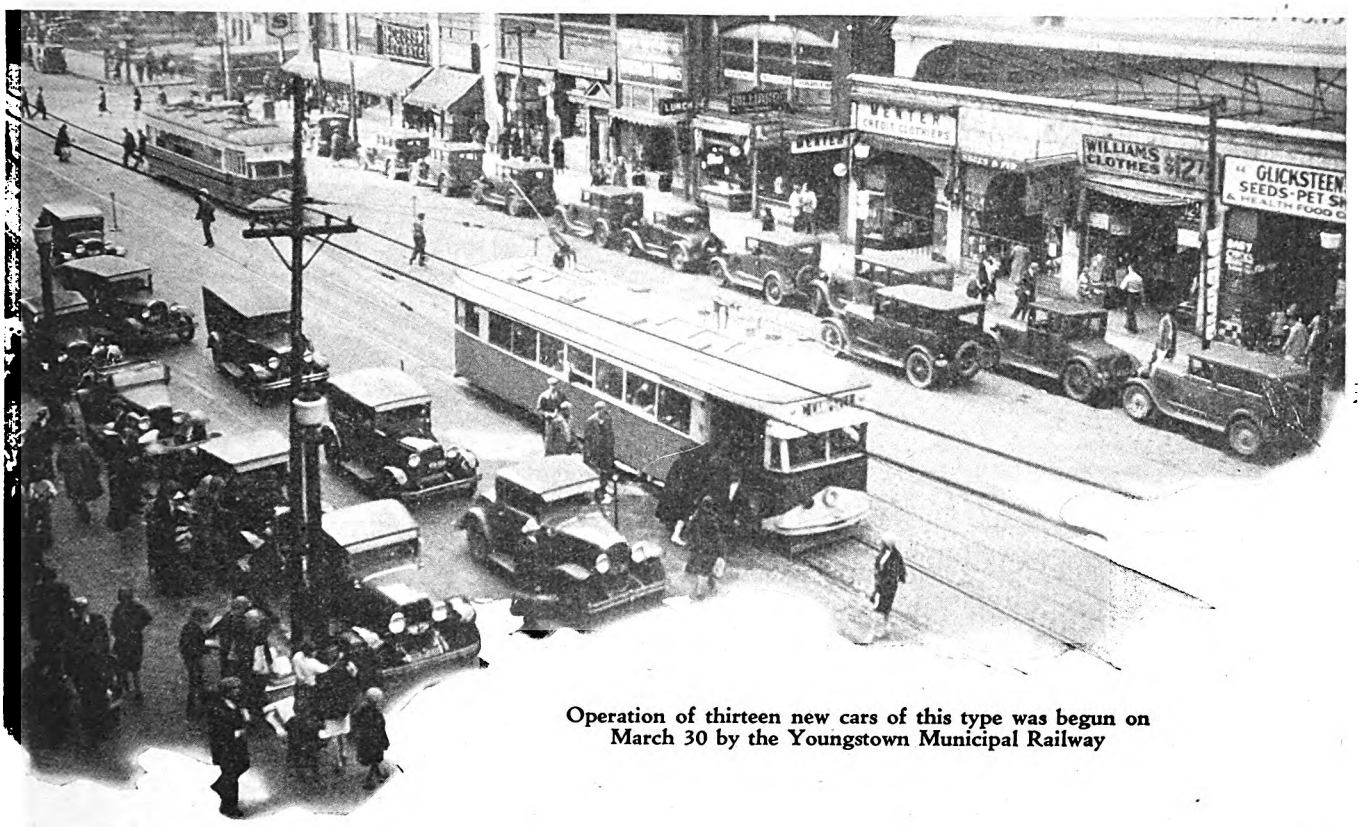
Among the investigations undertaken by the survey were the following: A complete study of the traffic volume, classified according to type of vehicle and direction, including turning movement at all downtown intersections; a count of all persons entering and leaving the downtown district, including the means by which they were transported; a study of the means used by patrons and employees of a selected group of 48 stores to reach the downtown district; a study of the vehicles parking and loading on the streets, as well as the use of parking garages and private parking lots. The survey gathered accurate statistics on the hourly variation of vehicular and pedestrian traffic flow at selected intersections, including the determination of the peak period. It made a study of the daily variation of vehicular flow at a selected group of intersections as well as seasonal variations; a stop-watch study of the characteristics of vehicular flow at a selected group of intersections by ten-second periods, including an analysis of the turning movement, number of pedestrians crossing against the signals, etc.; a study of the length and effectiveness of "Go" periods used by officers in regulating traffic at a large number of intersections.

In studying the different streets and analyzing traffic conditions, the survey took into account the fact that in every street there is a critical or determining lane which by virtue of its use decides how long the "Go" interval on that street should be in relation to the "Go" interval on the intersecting street. In the Pittsburgh survey unit time figures were used for the different types of movements which took place in the lane, such as street cars or automobiles going straight through, turning left or right, etc. "Go" periods, based on time demands of the critical lanes on the two streets, were determined by the average composition of traffic in the critical lane and the unit times required for the vehicle and street car movements in those lanes. Further studies were made of the delays caused by various types of left turns of various types of vehicles at different intersections. Speeds of street car movements and loading times on all of the downtown streets, as well as the delays were studied. Data on the unit time necessary for street cars and motor vehicles of various types to clear intersections were taken to aid in determining the time necessary for composite groups to clear intersections. Streets themselves were studied with respect to storage or reservoir capacity, block lengths, traffic capacity and the like.

Analyses of some of these studies brought forth some interesting street car data. They showed that the street car in Pittsburgh carried an average of 32 passengers per car, while the passenger automobile carried in downtown Pittsburgh only 1.89 passengers per car. Other studies showed that the street car required about three times as long to clear an intersection as a passenger automobile. Therefore, even considering that in the space occupied by a street car about two passenger automobiles could be moving, from the standpoint of street capacity only, the street car was shown to be several times as efficient as the automobile in furnishing transportation to the public.

Interesting data on the conditions which led to the installation of traffic control in Pittsburgh as well as facts derived from the survey are shown graphically in accompanying charts. There are also illustrations of the master panelboard and of signal mountings on existing trolley poles. Signal equipment installed on poles or posts especially for that purpose, present a very pleasing appearance.

Digitized by Google



Operation of thirteen new cars of this type was begun on March 30 by the Youngstown Municipal Railway

Speedy, Light-Weight Cars

Placed in Service in Youngstown

Latest type vehicle of Municipal Railway seats 45 passengers and weighs only 28,800 lb. High-speed, 300-volt motors used with WN drive and 22-in. wheels. Brakes and control are foot-operated

By

R. N. GRAHAM

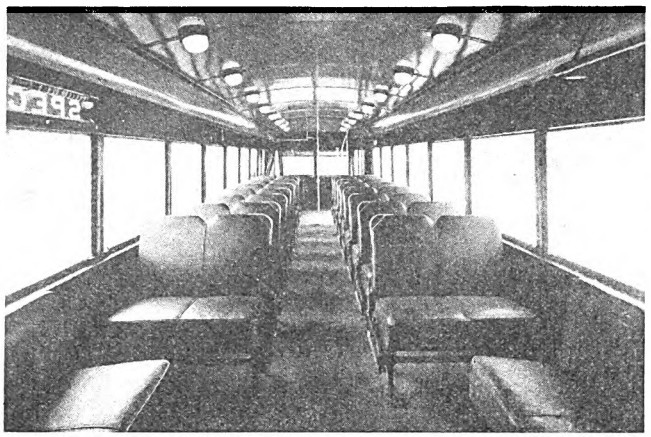
Manager Youngstown Municipal Railway

NUMEROUS departures from conventional practice are embodied in the design of a group of thirteen new cars just placed in service by the Youngstown Municipal Railway. They were built by the G. C. Kuhlman Car Company. Although the new car seats 45 passengers comfortably, it weighs only 28,800 lb. This low weight has been secured by the elimination of all doors except one at each end, the extensive use of aluminum in the framing and fittings, and the use of small, high-speed motors. Rapid acceleration is made possible by the relatively large amount of power available in proportion to the weight, and by automatic control. Both control and brakes are foot operated. Even during the short period these cars have been in service they have become very popular with the public.

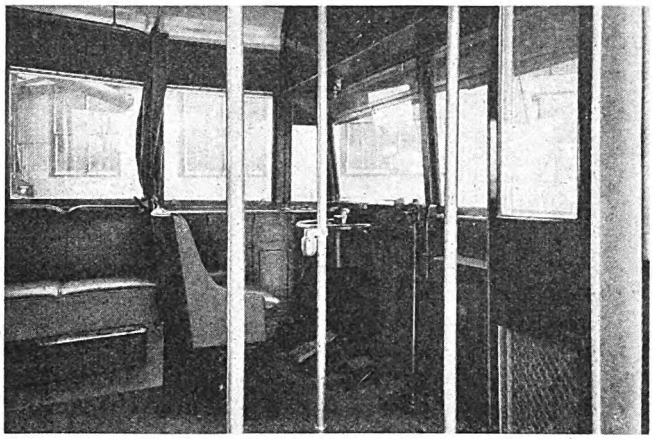
The rate of acceleration of the new cars has been found by actual measurement to be 3½ m.p.h.p.s. This is accomplished with a setting of the circuit breakers fully protecting the motors. The control is of the General Electric Type PCM. Fast, smooth acceleration is attained by increasing the number of resistance steps so that each increment of accelerating current is small, and at the same time cutting the resistances out of the motor circuit more rapidly than is feasible with the customary K controller.

On the main controller are nine series and nine parallel notches. Its action is automatic. The master controller is foot-operated and has three positions. The first position gives a slow speed, the second full series, and the third full parallel. Normally the operator presses the pedal down to full parallel position and the control

Digitized by Google



Accommodations are provided for 45 passengers on comfortable leather upholstered seats



Brakes and controller are operated by pedals. The reverser is in a cabinet at the left of the operator's seat, while the door control is immediately in front of him. The fare box, not shown in this view, hangs on the stanchion at his right

notches up under the direction of an accelerating relay. If he desires to hold the control on any resistance notch it is done by a simple manipulation of the pedal.

Line breaker, contactors and motor resistors are located under the car, while the reverser, which includes contacts for emergency electric braking, is inside near the operator so that in case of an air brake failure it can be operated directly by hand and stop the car with dynamic electric braking. The foot controller includes a pilot valve operated by the heel plate which provides the customary dead-man's features usual with one-man operation.

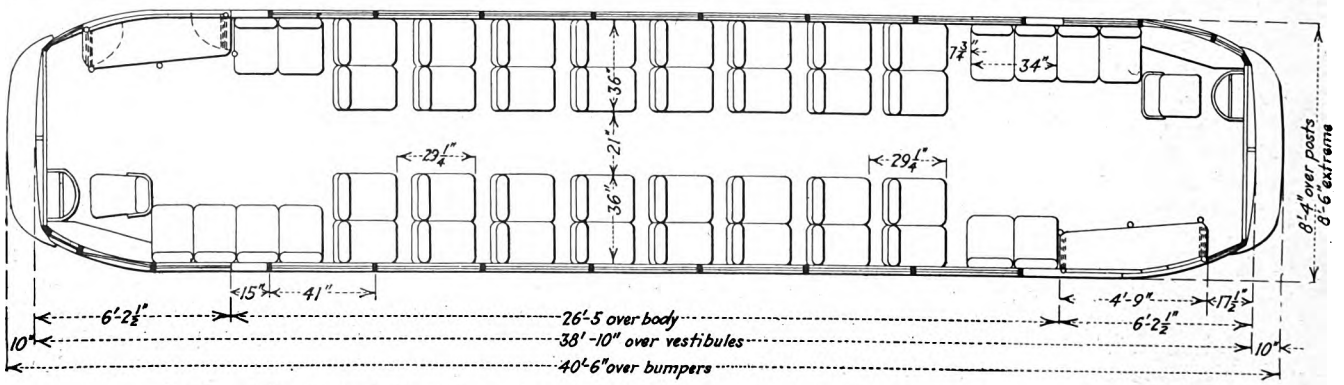
Of particular interest is the mounting of the motors and the WN drive. Brill trucks are used with certain modifications to care for this drive. The gear ratio is 7.21 to 1. A special support carries one-half of the motor weight while the other half of the motor weight and half of the gear unit weight are held by clevis castings supported by the transom. Positively-centered thermoid disk couplings are used and the link between the gear unit and the clevis casting has a ball and socket joint at each end, permitting freedom of motion in any direction to take care of the movement of the car axle. Transverse leaf springs and coil journal box springs contribute to the riding qualities of the car. The brake hangers are so constructed that noise is prevented even when the parts become worn.

This design of motors and drive has been effective in several ways in meeting the requirements of the Youngstown Municipal Railway. Chief among these is weight reduction. By utilizing a high-speed motor wound for 300 volts, high temperature insulation and a double reduction drive, sufficient clearance was obtained to permit the use of 22-in. wheels. The resulting economies in weight brought the total car weight down to 28,800 lb. or approximately 2,100 lb. less than the corresponding standard axle-hung motor, truck and 26-in. wheels.

To assure safety under all conditions, even in case of failure of air, the control being pneumatic, the reverser has been so designed that it functions through electrical

Details of New Youngstown Cars

Weight	28,800 lb.	Destination signs	Hunter	Motors	Westinghouse No. 1425A
Bolster centers	17 ft. 0 in.	Door mechanism	National Pneumatic	Painting scheme	Tan and cream
Length over all	40 ft. 6 in.	Doors	Folding	Roof material	Wood and canvas
Length over body posts	26 ft. 5 in.	Fare boxes	Cleveland	Sash fixtures	O. M. Edwards
Truck wheelbase	5 ft. 4 in.	Finish	Duco	Seats	Brill 210-C
Width over all	8 ft. 5½ in.	Floor covering	Tuco	Seat spacing	29¼ in.
Height, rail to trolley base	10 ft. 2½ in.	Gears and pinions	Westinghouse-Nuttall	Seating material	Leather
Window post spacing	41 in.	Glass	Non-shatterable	Steps	Stationary
Body	Semi-steel and aluminum	Hand brakes	Peacock	Step treads	Kass
Roof	Arch	Heat insulating material	Celotex	Trolley catchers	Ohio Brass
Doors	End	Heaters	Railway Utility	Trolley base	Ohio Brass
Air brakes	Westinghouse, foot control	Headlights	Ohio Brass	Trolley wheels	Ohio Brass
Axles	Brill	Headlining	Haskelite	Trucks	Brill 177-E-1-X
Car signal system	Consolidated	Interior trim	Mahogany—steel frieze and moldings	Ventilators	Brill
Compressors	Gen. Elec. C-27-B	Journal bearings	Plain, 3½ x 6	Wheels	Naco, 22 in. diameter
Conduit	Duratube	Journal boxes	Brill	Fenders	Eclipse NB
Control	Gen. Elec. PCM	Lamp fixtures	Elec. Service Supplies		

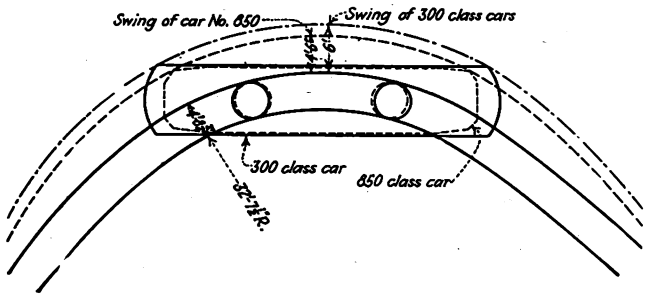


Plan and principal dimensions of new Youngstown car built by The G. C. Kuhlman Car Co.

Digitized by Google

connections instead of through air. The reverser handle is located on a panel convenient to the operator; when turned to the left it exercises its usual function of reversing the motors, but when the handle is turned to the right the motors act as a dynamic brake, providing a positive retardation for the car under any circumstances, even though air is gone and there is no power.

Braking on these cars is unusually effective. In tests, retardation as rapid as 6 m.p.h.p.s. has been realized. These brakes are equipped with automatic retardation control furnished by the Westinghouse Traction Brake



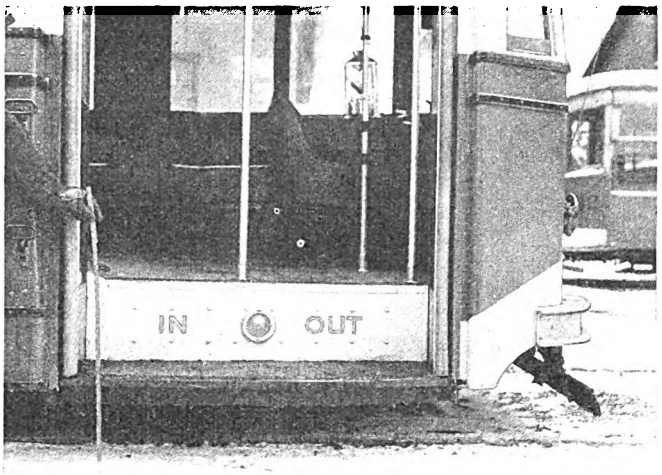
Comparison of car swing of new cars of Youngstown Municipal Railway and cars of approximately the same capacity of an older type

Company, which also has supplied the entire braking apparatus with the exception of compressors, which are made by the General Electric Company. When the brake pedal is depressed the sudden retardation of the car automatically actuates a lever which cuts off the air, this process being continued until the car is brought to an easy stop.

Use of the 22-in. wheels makes possible a very low floor. However, there is a 3-in. ramp from the bolster graduated to the well step. The first step is 13 in. from the ground to the well; the step from the well to the floor of the car is 12 in. There are no bulkheads, and with the platforms on the same floor level, an extremely rigid framing for the entire floor is provided. The floor is Flexolith without trapdoors or openings of any kind. Aluminum is used freely in the framing of the car for the strength members where there are no severe stresses. Aluminum sheets are used on the exterior of the car instead of steel. It is also used on all interior fittings including metallic parts of seats.

A door-opening valve located convenient to the operator has separate positions for the front leaf of the door, the back leaf of the door, and for both doors. At the bottom of the left front sash in front of the operator a sash heater is installed to prevent frost from collecting on the window, either outside or inside. This is the standard practice of the railway. The heater has been especially designed for the purpose and bears the approval of the Underwriters' Laboratory. Above the front sash are two ventilators. The opening of these ventilators speedily changes the air in the car.

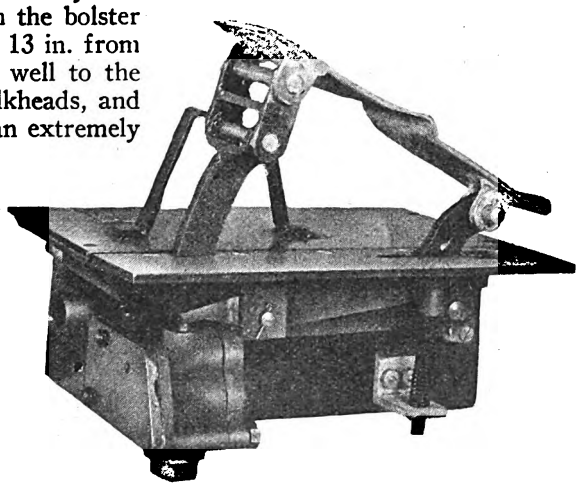
No apparatus or paneling is visible



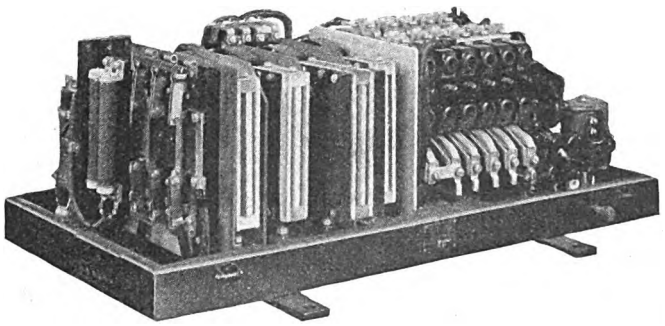
The height of the first step is 13 in. and the second is 12 in. The ramp is 3 in.

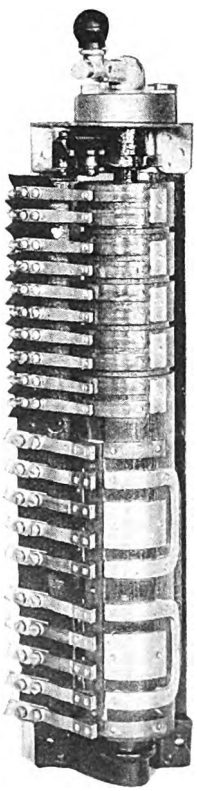
at the front of the car with the exception of the one vestibule heater, the door-opening valve, the air gage and the emergency brake. All switches for the car operation are paneled in at the side of the operator where he has easy access to them.

The operator's seat is Brill bucket type No. 1006 and can be moved up or down, backward or forward. When the operator changes ends, the seat can be turned in a firmly fixed position to be used by a passenger. Illuminating the inspection plate of the fare box is made possible by a small aluminum-covered light located on the fare box stanchion. The passenger seats are of the deep spring type upholstered in leather.



General Electric type C-523-A foot control, weighing only 38 lb., is used on the new Youngstown cars



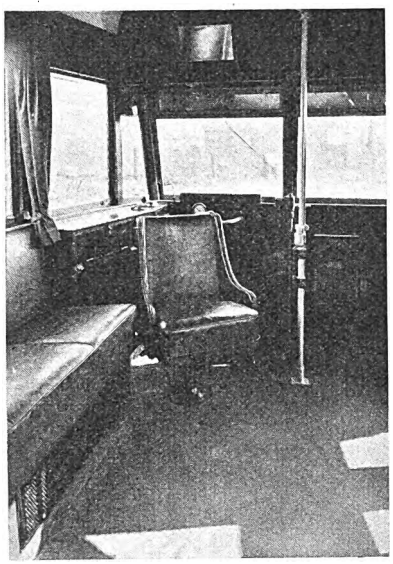


Main control switch group weighing 447 lb. is placed under the floor of the car. Covers are removed in this view. At right—The reverser switch, weighs 42 lb. It is housed in a cabinet at the left of the operator

Digitized by Google

Illumination is furnished by a double row of dome lights. In conformity with standard on the Youngstown property, twenty lights are in series, using 32-volt gas-filled Mazda lamps short circuiting and with short circuiting sockets. Side destination signs are placed in the roof letterboard. Destination signs in front and rear are of extraordinary size, providing visibility for many blocks. The headlight is equipped with louvers, illuminating the entire dash, thus outlining the front end of the car. This is done instead of using two headlights, as the use of two headlights tends to confuse the user of the street into thinking that the vehicle is a bus instead of a car and thus is a vehicle that can turn from its indicated course. There is a visor extending around the entire front sash to keep ice and snow off the window.

Heretofore it has been usual to install door engines over folding doors, with a door to give access to the equipment. This door is likely to rattle and is usually unsightly. In the Youngstown cars the sign molding is continued over the door engines, and slots are provided by which the door engine can be reached and adjusted through the sign molding.



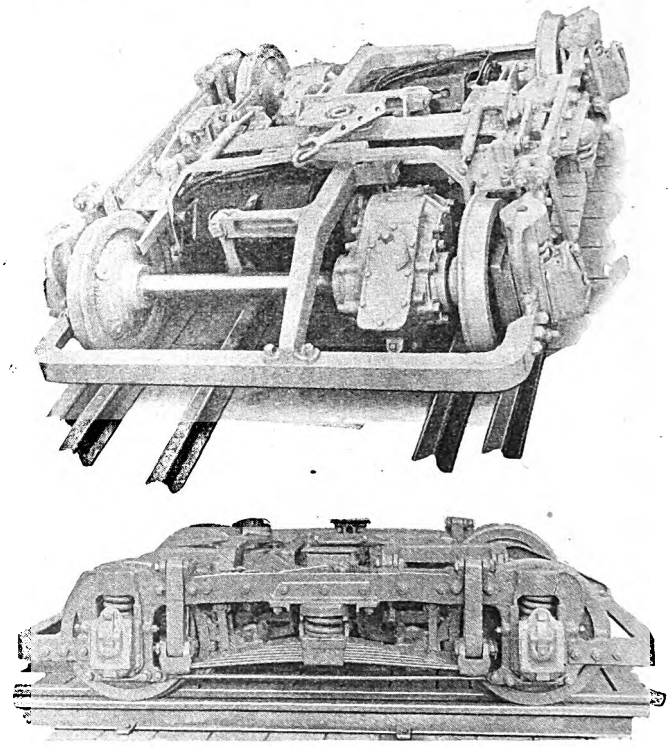
At the rear end of the car the operator's seat is swung around and made available for passenger use

These new cars are being operated on the most important route in the system, a double-track line extending from one of the largest plants of the Youngstown Sheet & Tube Company on the northwestern city limits through the southeastern city limits to another large plant of the same company at Campbell. This route runs for three-quarters of a mile on the main street through the congested district of the city. For 3 miles it follows United States Highway Route 422, the main route to Girard, Niles, Warren and Cleveland and one of the heaviest traveled highways in the United States. The new cars were specially designed for service on this line after a careful study of the route.

For a number of years the Youngstown property has been operated on a 100 per cent one-man basis, with an actual increase of schedule speed over former two-man operation. The first installation of one-man cars in the city was on the line where the new cars are now being used. This installation was made in 1923 with Birney cars. It was thought that the short headways on which the Birney cars were operated would be effective in meeting jitney competition. Experience showed, however, that on a line more than 7 miles long, extending some 3½ miles in each direction from the Central Square, the use of the small cars was not economically desirable.

As the new cars are much larger in seating capacity, the service can be given with fewer vehicles. Moreover, this change was accompanied by a reduction of ten minutes in the round-trip running time, due to the more rapid acceleration and deceleration of the new equipment. As a result it has been possible to eliminate fourteen runs from the schedule with a large saving in operating expense. At the same time this change released a number of Birney cars for use in tripper service elsewhere, thus enabling the company to retire from service twelve cars which were too heavy for economical operation.

Previous to the actual installation of service on this line approximately 70 operators had been thoroughly drilled in the operation of the cars. Since a large proportion of the operators on the Youngstown Municipal Railway have been many years in the service and consequently are comparatively old men, it was feared that some trouble might be experienced in the use of the foot control. However, the universal reaction of the men was



Brill 177-E-1-X trucks are used with Westinghouse 1425A motors and WN drive

that the new method of control was more convenient than the hand control. There has been no resentment and no criticism of this type of control from any operator. The typical reaction of the operators is shown by the report of one of the Transportation Intermediate Safety Committees, the first four of whom are car operators and the last two bus operators. Their opinion is the general opinion of the men on the property. The report reads as follows:

> We, the members of the Intermediate Safety Committee of the Youngstown Municipal Railway Company, on the morning of March 18, 1930, made an inspection trip on the new 850 class car.
>
> The car was in regular passenger service on the Mosier-Campbell line.
>
> During the course of this trip we had an opportunity to examine and observe the action of all safety devices with which this type of car is equipped.
>
> The many comforts and conveniences afforded the passengers, the ease with which this type of car is operated by the foot controls, and other new features, in our opinion, places this type of car far in advance of other equipment with which we are familiar, both from a safety and an operating point of view.

The public reaction to the new cars has been entirely favorable. The quick pick-up, quietness, ease of operation and the extraordinary vision afforded the passenger have quickly popularized the car with the riders.

Digitized by Google

Single Life vs. Renewable Track

Additional opinions from way engineers concerning basic principles of track design and construction

THAT it is not worthwhile to design track with the intention of replacing worn rail with new rail on the old ties and foundation is the belief held by two way engineers whose opinions were received too late for inclusion in the article published in the April issue of the JOURNAL.

It is realized by everyone, according to W. W. Wysor, chief engineer, United Railways & Electric Company of Baltimore, that the rails on which cars operate will sooner or later have to be replaced on account of wear and deterioration from natural causes, but attempts have been made from time to time to construct a foundation which would be more or less permanent and which it would not be necessary to renew when rails were replaced. Such attempts have met with varying degrees of success depending upon methods adopted, thoroughness with which the work was carried out and local conditions. By local conditions are meant not only the conditions which prevail in any one town or community but the conditions that vary with each street location and with different sections of the same street. It can be said, however, without fear of contradiction that none of these plans has been 100 per cent successful.

Granting that it is beyond the realm of possibility to secure a rail that will in itself be permanent, since it is subjected to wear, the ideal arrangement, Mr. Wysor believes, would be to have a foundation of permanent character on which the rails would rest, so that it would not be necessary to disturb the foundation when reconstructing track but merely to unfasten the rails from their holding device and put in place a new set of rails. If the track foundation were built after the manner of foundations for our bridges and skyscrapers we might conceivably hope for a permanent sort of foundation, but even then such parts as were used as fastenings or direct support for the rail would be subjected to corrosion and wear and it would be necessary to renew them along with the rail.

However, any such foundation is out of the question from both the standpoint of cost and practicability, and since the streets are filled with other underground structures such as water pipes, gas pipes, heating pipes, sewers, conduits, etc., many of which extend directly under the track area, the roadbed supporting the track is subjected to settlements which occur at more or less frequent intervals depending upon the nature and extent of the underground structure and the frequency with which the street is opened for extensions to or repairs on these structures. In addition to that, the city reserves to itself the right to change grade and this is frequently done in connection with a change in character of paving. It would seem, therefore, that there is no practical way of securing a type of track foundation that could be considered permanent for the following reasons:

The immediate support of the rail, usually some sort of tie plate is subjected to wear and corrosion, and by the time the rails are worn out these plates are usually not fit for further service.

If tie plates are not used and the rail rests directly on ties, then the ties themselves are subjected to wear, as well as decay or corrosion, and proper bearing for the new rail on the old ties cannot be secured.

The support for the rails, whether by ties, stringers, blocks or what not, is subjected to settlement which not only throws the tracks out of surface but also frequently out of line. These settlements may be due to natural causes where the underlying ground is soft or from artificial causes where the street is built on a fill or where water leaks occur or where openings have been made for underground structures either belonging to the city or to other public service corporations, or even to private parties.

Grade of the street may be changed by the city authorities.

It is the opinion of Mr. Wysor, therefore, that as a general proposition tracks should be constructed with a type of foundation that will give adequate support for the rail during its entire life, but when the time comes to renew the rail that it will be necessary to also renew the supports, even though in some cases much of the supports may be salvaged and used again.

A similar opinion is held by H. E. Bean, chief engineer, New York State Railways, Syracuse, who points out that when the time arrives for the renewal of the rail on the old structure, it is quite probable that a general resurface of the whole street will occur. At such times, considerable changes occur in underground structures of other utilities or municipalities in making renewals, relocations or additions and cuts are bound to occur across the railroad area.

It is doubtful if rail could be renewed on an old structure with as good results of surface, stability and appearance as if the whole foundation were replaced. The utility might be nearly as good but the ultimate saving, everything considered, would be insufficient to merit extraordinary expenditures for this purpose alone, especially in view of the disposition to substitute buses on many of the present car lines. It is possible to construct track locally for a minimum life of 20 years and it would seem, according to Mr. Beau, that expenditures for possible life beyond that point would be purchasing possible insurance at a very high rate.

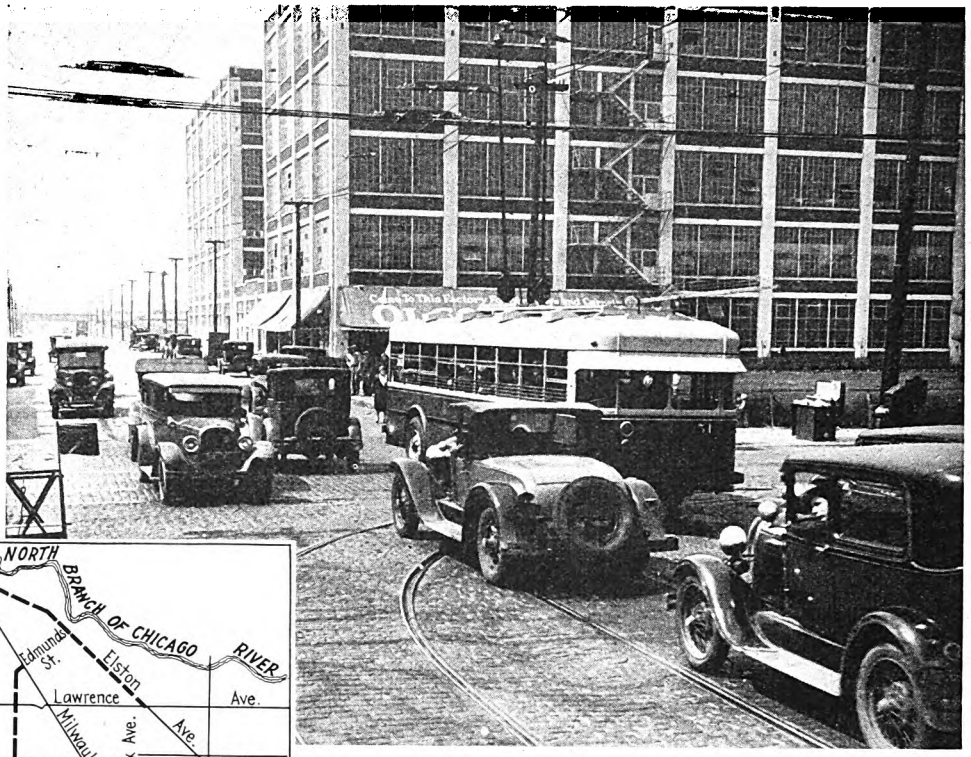
"Improving Design to Meet Present Day Demands"

All of the industry's major objectives will be treated in articles, showing how equipment design has aided in raising the standards of service, in

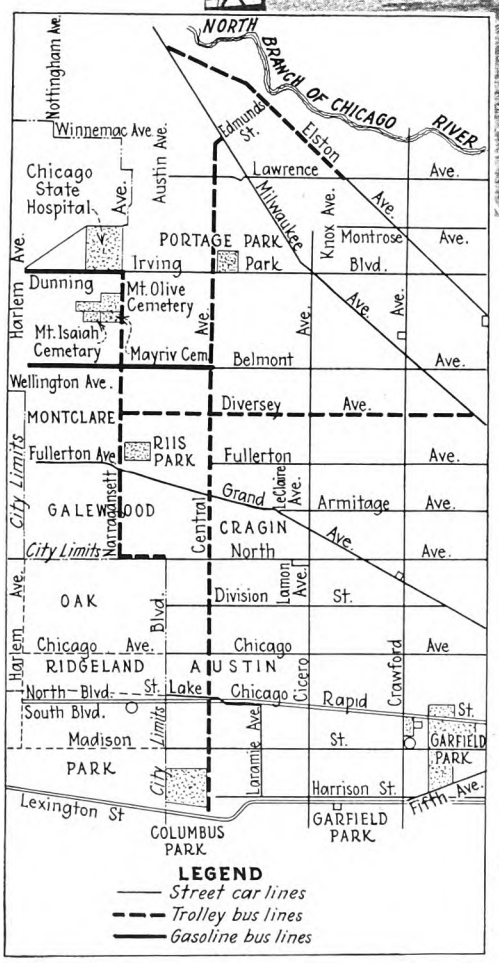
***The* Annual Convention Number *of* Electric Railway Journal**

TO APPEAR ON
JUNE FOURTEENTH

Digitized by Google



Flexibility of movement in traffic is one of the major advantages of the trolley bus



New trolley bus extensions will serve northwest section of Chicago

Chicago Inaugurates

Largest Trolley

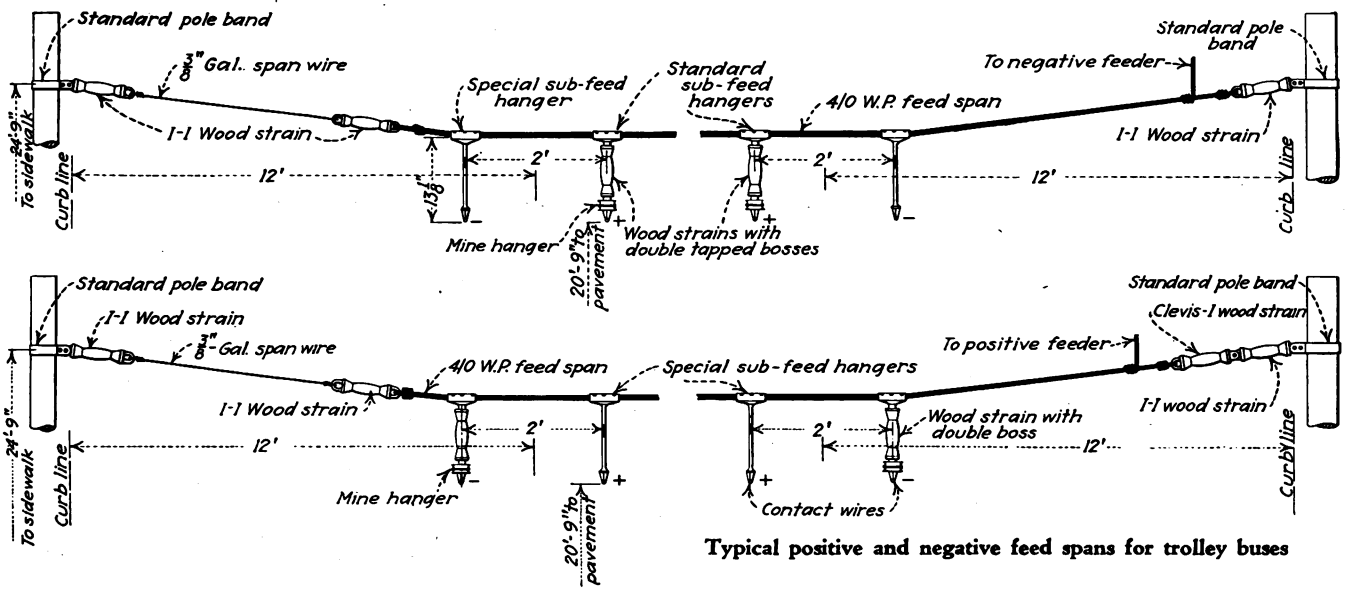
WITHIN four months the Chicago Surface Lines will be operating the largest fleet of trolley buses in the United States. Forty-one vehicles, recently purchased and embodying the latest developments in design, will serve five routes in the northwest section of the city. The total mileage to be covered, consisting for the most part of extensions to present street car lines, will be 17 miles. Service was actually begun on April 17 on Diversey Avenue, a route of 3.75 miles. Thirteen trolley buses are providing a three-minute service during the rush hours and a seven-minute headway in the off-peak hours on this line.

The inauguration of this service is the result of a decision by the Illinois Commerce Commission on March 6, withdrawing Chicago Motor Coach buses from the streets in the northwest section of the city and directing the Chicago Surface Lines to establish bus service as extensions of its rail lines in this territory. This decision is important in that it recognizes the principle that the extension of service should be provided by the utility established in the field. When the state commission in 1928 gave the Chicago Motor Coach Company permission to operate on these streets, it ignored this principle and the courts have held the order void on appeal prosecuted by organized citizens of the community. The people objected to motor coach service which required a 10-cent fare with transfers only to Motor Coach lines, and demanded bus extensions of street car lines on the basis of a 7-cent fare with transfers to the Chicago Surface Lines system.

Eight routes were included in the commission's order for bus substitution, five of which will be served by trolley buses and three by gasoline buses. The lines to be served by trolley buses, together with their mileage, are as follows:

Diversey Avenue	3.75 miles
Narragansett Avenue	3.0 miles
North Avenue	0.5 miles
Central Avenue	7.5 miles
Elston Avenue	2.75 miles

Digitized by Google



Typical positive and negative feed spans for trolley buses

Gasoline bus service will be installed on the following lines:

Belmont Avenue	2 miles
Irving Park Boulevard	1 mile
103rd Street	1 mile

Orders were placed immediately following the decision of the commission, and with the co-operation of the Twin Coach Company, the J. G. Brill Company and the St. Louis Car Company, who rushed construction of the equipment, service was begun on scheduled time and will be installed within the four-month period ordered. The total order consists of 29 Twin Coaches, 6 Brill-American Car Company, and 6 to be built by the St. Louis Car Company.

In addition to the trolley bus service on Diversey Avenue, gasoline buses were placed in service on Belmont Avenue on April 17. Four buses are being used on this line as a temporary measure. It is contemplated that this route will eventually be served by trolley buses. Bus service on 103rd Street, a route of 1 mile, will be installed early in May. Three buses will be used on this route. Only one bus will be necessary on the Irving Park extension.

Bus System

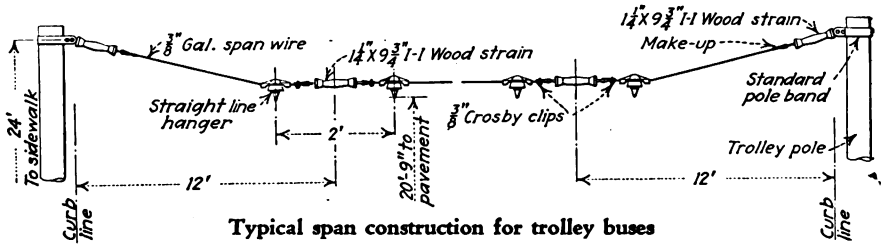
First line in 17-mile program put into operation on April 17. Within four months 41 trolley buses will serve five routes. Important principle established by substitution decision

Twin Coaches now owned by the Chicago Surface Lines will be put into service on these three routes.

Listed elsewhere in this article is a table giving the specifications of the new trolley buses. However, a number of very noteworthy features should be considered separately. The Twin Coaches will be equipped with Westinghouse motors, controllers, air brakes and compressors, while the Brill and St. Louis vehicles will use General Electric design for this equipment. Each bus will be equipped with an Edison 12-volt storage battery No. B1-H10, eighteen-hour capacity, which will be charged through the air compressor circuit. Due to the fact that there are certain short stretches on the line where the polarity of the overhead will be reversed, a polarized relay is used to prevent the discharge of the battery. This 12-volt circuit is used for the operation of the treadle on the rear door, for the marker lights on both front and rear of the bus and for the two emergency lights inside the bus.

Both the brakes and controllers are foot-operated. The pedals are placed on the right-hand side of the steering column to be operated with the right foot, the control pedal on the right. They are so spaced that both cannot be operated at the same time by one foot. Pressure on the brake is proportionate to the pressure on the pedal. All buses will have the brake applied by self-lapping valves operated by the pedal. An application valve is placed near the rear wheels so that braking will take place on these wheels first. A quick release valve is placed near the front wheels so that they will release first to facilitate steering.

On the left of the steering column and so located as to be foot-operated are the button for the horn and an electric foot switch for the operation of the fare register. Also on the left of the operator and in a convenient position for hand operation is the reversing mechanism,



Typical span construction for trolley buses

Digitized by Google

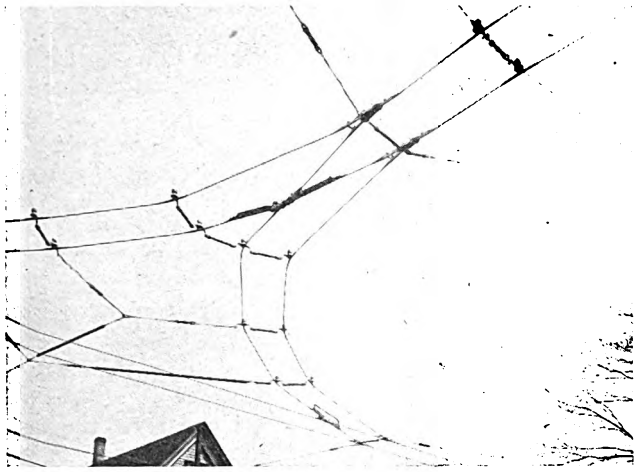
as well as a push button to be used for setting the rear treadle door for automatic operation. The door-operating mechanism for the front door is controlled by a valve in front of the operator. Likewise, the various switches for lighting circuits are placed directly in front of the operator under the windshield.

The ventilating system was carefully considered. It was designed by the engineers of the Chicago Surface Lines and subsequently built by the Railway Utility Company. It is believed that the ventilators used on this new equipment have a greater exhausting capacity than any previously used. The two intake ventilators are at the rear of the bus and feed air through the body to six exhaust ventilators placed in the center and front of the bus.

Trolley Bus Specifications

Equipment	Twin Coach	Brill-American Car Co.	St. Louis Car Co.
Axle, front	Timken Detroit No. 1669W	Timken Detroit No. 1669W	Timken Detroit No. 1669W
Axle, rear	Timken Detroit Ratio 10½ to 1	Timken Detroit No. 6536 double bowl. Ratio 10½ to 1	Timken Detroit No. 6536 double bowl. Ratio 10½ to 1
Battery	Edison 12-volt storage. B1-H10 18 hr. capacity	Edison 12-volt storage. B1-H10 18 hr. capacity	Edison 12-volt storage. B1-H10 18 hr. capacity
Brakes	Westinghouse air brakes	General Electric air brakes	General Electric air brakes
Buzzers	Consolidated Car Heating. Pull cord operation	Consolidated Car Heating. Pull cord operation	Consolidated Car Heating. Pull cord operation
Chassis—Framing Posts	Structural steel, bi-metal side girder 1¾x1¾x¼" steel tees	Steel—Steel sheeting on outside and panel lining inside U-shaped steel	Aluminum—Aluminum girder and lining construction U-shaped steel
Color	Red and cream with gray roof	Red and cream with gray roof	Red and cream with gray roof
Compressors	Westinghouse D.H-10; 10 cu.ft. per min.	General Electric C.P-25, 10 cu.ft. per min.	General Electric C.P-25, 10 cu.ft. per min.
Controller—Master Main	Westinghouse XM 164 WestinghouseV.A. (variableautomaticaccel.)	General Electric C-507 General Electric P.C.M. (automatic accel.)	General Electric C-507 General Electric P.C.M. (automatic accel.)
Current collection devices Swiveled Harps Trolley Poles Trolley Bases Retrievers	Ohio Brass Co.	Ohio Brass Co.	Ohio Brass Co.
Dimensions Length over all Width over all Step Riser Minimum headroom	 31 ft. 10 in. 96 in. 15 in. 13 in. 74 in.	 33 ft. 5 in. 95½ in. 14 in. 13 in. 74¼ in.	 31 ft. 11 in. 96 in. 15 in. 13 in. 76 in.
Doors, front	Double passage, 44-in. minimum clearance	Double passage, 46-in. minimum clearance	Double passage, 44-in. minimum clearance
Doors, rear	Treadle operated, 30-in. clearance	Treadle operated, 33-in. clearance	Treadle operated, 30-in. clearance
Door controls	National Pneumatic air operated	National Pneumatic air operated	National Pneumatic air operated
Flooring	Brown battleship linoleum, 5/16 in. thick	Brown battleship linoleum, 5/16 in. thick	Brown battleship linoleum, 5/16 in. thick
Headlights	Type WCF dash illuminating, Ohio Brass	Type WCF dash illuminating, Ohio Brass	Type WCF dash illuminating, Ohio Brass
Heaters	Consolidated Car Heater Co. Sixteen 500-watt heaters at 560 volts One 1,200-watt cab heater	Consolidated Car Heater Co. Sixteen 500-watt heaters at 560 volts One 1,200-watt cab heater	Consolidated Car Heater Co. Sixteen 500-watt heaters at 560 volts, One 1,200-watt cab heater
Horn	Westinghouse, air operated, single tone	Westinghouse, air operated, single tone	Westinghouse, air operated, single tone
Lighting 600-volt circuit Battery circuit	 Twelve body lights in dome fixtures Three sign box lights Two step lights Two headlights One tail light Head and sign lights on separate circuit One stop light Two 25-watt interior emergency lights Front and rear marker lights	 Twelve body lights Three sign box lights Two step lights Two headlights One tail light Head and sign lights on separate circuit One stop light Two 25-watt interior emergency lights Front and rear marker lights	 Twelve body lights Three sign box lights Two step lights Two headlights One tail light Head and sign lights on separate circuit One stop light Two 25-watt interior emergency lights Front and rear marker lights
Mirrors	Three, two inside, one to treadle door, one to rear, one outside rear view	Three, two inside, one to treadle door, one to rear, one outside rear view	Three, two inside, one to treadle door, one to rear, one outside rear view
Motors	Two 50-hp., Westinghouse model 1426CT6	Two 50-hp. General Electric model, GE298E	Two 50-hp., General Electric model, GE298
Registers, fare	International R-10, electrically operated by foot button	International R-10, electrically operated by foot button	International R-10, electrically operated by foot button
Roof	Arched	Arched	Arched
Seats	Semi-bucket, leather upholstered	Semi-bucket, leather upholstered	Semi-bucket, leather upholstered
Seating capacity	40 passenger	40 passenger	40 passenger
Tires, front, rim and size	20 x 10.50	20 x 10.50	20 x 12.00
Tires, rear, rim and size	24 x 7 duals	20 x 9.75 duals	22 x 9.75 duals
Trolley pole spacing	24 in.	24 in.	24 in.
Ventilators	Railway Utility Co., Honeycomb type, two intake and six exhaust ventilators. Air movement 15 m.p.h. or 5,400 cu.ft. per hr. per ventilator	Railway Utility Co., Honeycomb type, two intake and six exhaust ventilators. Air movement 15 m.p.h. or 5,400 cu.ft. per hr. per ventilator	Railway Utility Co., Honeycomb type, two intake and six exhaust ventilators. Air movement 15 m.p.h. or 5,400 cu.ft. per hr. per ventilator
Weight	17,500 lbs. (scale)	17,700 (estimated)	16,000 (estimated)
Wheelbase	195 in.	216 in.	212 in.
Windshield	Non-shatterable glass	Non-shatterable glass	Non-shatterable glass
Windshield wipers	Two—air operated	Two—air operated	Two—air operated

Digitized by Google



Special overhead "Y" construction at Harding and Diversey Streets

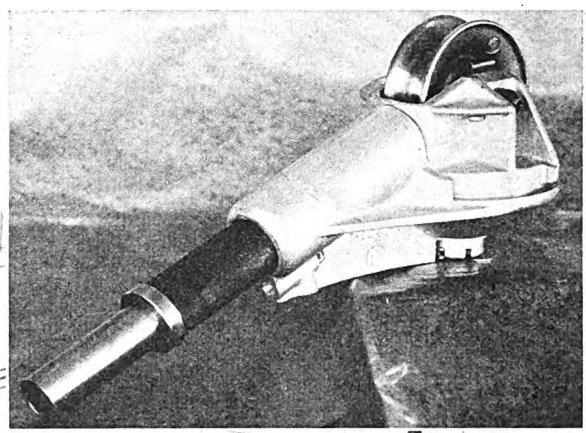
The ventilators are of the honeycomb type, and are designed to handle an air movement of 15 m.p.h., or 5,400 cu.ft. per hour per ventilator. With a bus empty the air can be completely changed every two minutes.

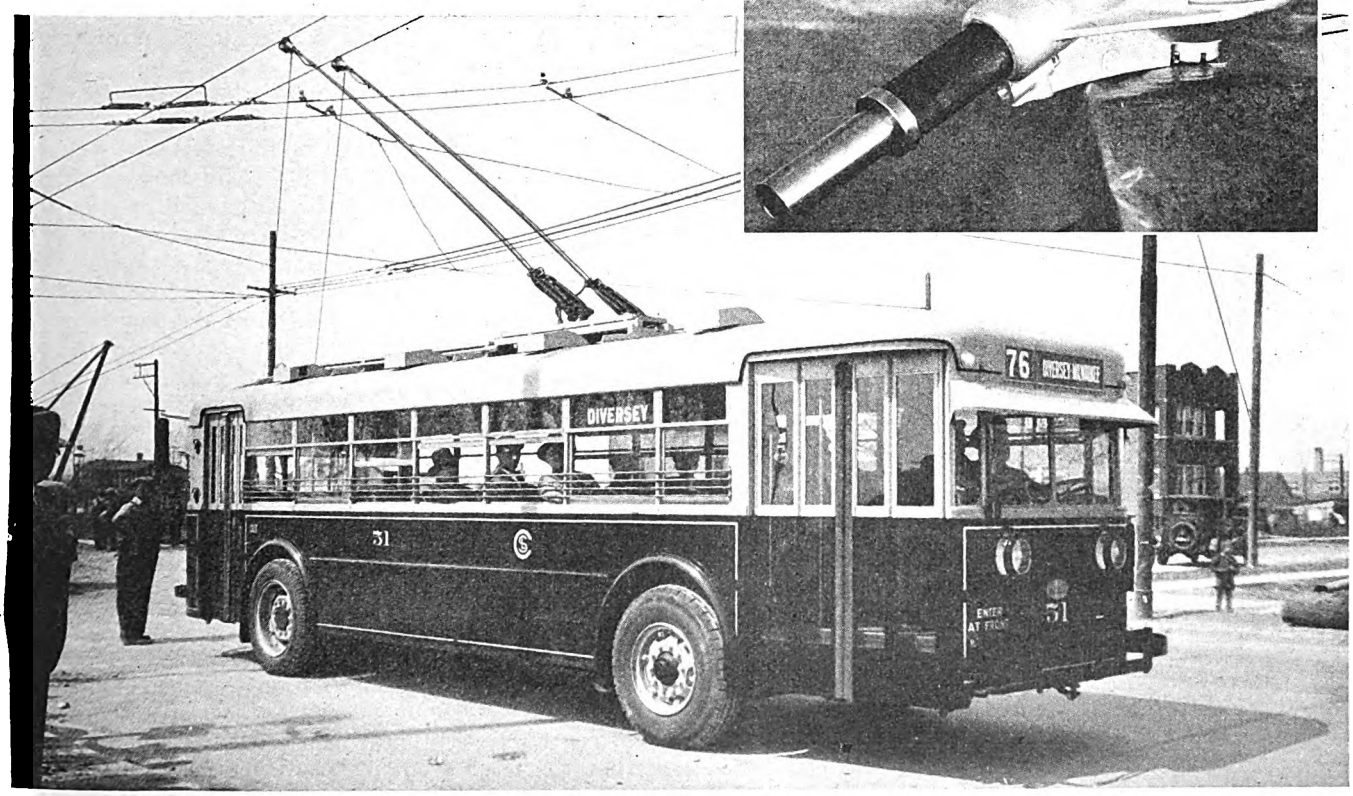
Special attention was given to the design of the doors, their operation and dimensions. The front doors are built for double passage, either entrance or exit, and have a minimum clearance of 44 in. They are of the double jackknife type and are mechanically operated by National Pneumatic equipment. The rear doors have a clearance of 30 in. and are treadle operated.

The lighting of the bus is arranged on four circuits, exclusive of the battery circuit. The advantage of these different circuits is that in case a fuse blows in one or the other there will always be light at the front and rear of the bus. The head and sign lights are on separate circuits for this reason and likewise the two rear interior dome lights are on a circuit with the sign lights, so that in case anything happens to the tail light these two rear inside lights will furnish sufficient illumination for the rear of the bus.

The overhead system is quite completely described in the accompanying two drawings, which show typical positive and negative feed spans and typical tangent spans. The trolley wires are spaced 24 in. apart, as are the trolley bases on the bus equipment. The wires used on the installation are the Phono-Electric, the high conductivity wire being manufactured by the Bridgeport Brass Company, and a hard-drawn copper wire by the American Brass Company. The ears were supplied by the R. R. Holden Company and are of the pressed copper underslung type. The greater part of the special overhead equipment consisting of hangers, span insulators, insulated and non-insulated special cross-overs, insulated approaches, and frogs of the standard and spring type were supplied by the Ohio Brass Company. Power is being supplied to the various lines from the existing substations of the Chicago Surface Lines, and General Electric automatic sectionalizing switches have been installed at certain points to assure the proper amount of current being supplied to any one section. These switches automatically assist in supplying current to the existing street car lines as well as to the new trolley bus lines.

An Ohio Brass swivel harp. The swivel casting is mounted on the lower casting over a 4½-in. ball bearing





Improvements in body design, comfort and speed have been important factors in the renewed interest in trolley buses

Digitized by Google

Central Master Mechanics Discuss Equipment

New and reconditioned bearings compared. Lubrication extensively discussed. Papers presented on flat top journal bearings, trolley buses and trolley wire lubrication

IMPROVED maintenance methods, new equipment, and interurban exchange practices were enthusiastically and extensively discussed at a two-day meeting of the Central Electric Master Mechanics Association in Mansfield, Ohio, April 9 and 10. Delegates from the leading railways of seven states as well as many manufacturers' representatives participated in the three business sessions.

The value of new bearings as compared to those reconditioned and the methods of reconditioning them were the principal subjects of the first session. A. B. Creelman, superintendent of equipment, Pennsylvania-Ohio Power & Light Company led the discussion by presenting a paper which pointed out the difference in service obtained from the use of new journal and armature bearings, as compared to those reconditioned in the average railway shop. Quoting from experience he told of the results obtained by using different type bearings and showed that his company had received better results with new solid bronze bearings. While emphasizing his preference for this type of bearing, he pointed out that babbitt can and is being used with success, but that the difficulty in reconditioning bearings with babbitt lies in the inadequate equipment the operators now have at their disposal for doing such work. He does not believe that in the average shop the shells can be tinned and the babbitt replaced as well as a manufacturer can do it.

One of the most interesting discussions of the convention was that of the use of flat top journal bearings. H. A. Barbero, master mechanic, Chicago, Elgin & Aurora Railroad, told of the excellent results which his company has obtained with the use of flat top journal brasses. The points he stressed in his discussion were that the additional weights and slightly additional cost were overcome by the greatly increased efficiency and considerably longer life of the flat top brasses over those now in general use.

G. M. Wood, Westinghouse Electric & Manufacturing Company, discussed at some length the renewed interest in the trolley bus and supplemented his talk with two reels of moving pictures showing trolley buses in operation in Salt Lake City. He reviewed the history of the trolley bus and pointed out the defects of the earlier equipment. He then showed how these defects had been overcome to make the new trolley buses attractive, comfortable and efficient. He quoted some figures from the installation in Baltimore, stating that the cost of operation of trolley buses in that city was approximately three-quarters of that of the gas buses. His data showed that a trolley bus could be operated for approximately 21 cents per mile, exclusive of fixed charges.

At the afternoon session, E. J. Jonas, superintendent of equipment, Cincinnati Street Railway, discussed "The Pull-in Record as an Index to Maintenance and Inspection Efficiency." He compared maintenance practice with that of manufacturing a product. He stated that the rejection volume of the inspection department of a manufacturing company is the measure of manufacturing efficiency, and that complaints from users are a reflection on inspection. Likewise he believes that pull-ins in car operation are a reflection on maintenance inspection.

Current collection by means of the trolley shoe, and trolley wire lubrication were the subjects of a talk given by W. J. Vaughn, representing Del A. Smith, general manager, Department of Street Railways, Detroit. Experiments with the use of trolley shoes and trolley wire lubrication are being extensively carried out by the Detroit Street Railway and, although not yet completed, excellent results so far have been attained. According to the reports given by Mr. Vaughn, a shoe collector running beneath a properly lubricated wire will not only eliminate arcing and subsequent burning of the trolley wire, but will treble the life of the wire itself. A lubricant composed of a graphite base has been used with success. It not only acts as a perfect conductor but builds up on the wire thus protecting it from wear. Some very interesting figures were presented. During a period of nine months there is a record of one line having withstood 265,000 car passes without showing any appreciable wear. Actual micrometer tests have been made at regular intervals.

Two other papers were read and discussed at this meeting; namely, "Application of Tool Steel Gear Drive for High Speed Motors," by E. S. Sawtelle, vice-president, Tool Steel Gear & Pinion Company; and "Naco Spun Steel Car Wheels and Their Manufacture," by J. T. Kittredge, manager, National Malleable & Steel Castings Company, Sharon, Pa.

Supplementing the morning discussion on journal bearings, President Challeen opened a discussion on the placing of responsibility for repacking journal boxes after cars had been operated through water. It was decided by the convention that the operating company handling equipment through water would be responsible for removing the waste and repacking the journal boxes before the cars so operated were put back into interchange service.

A banquet concluded the activities of the first day. Musical selections given by the Eastern Michigan Railways Quartet were much enjoyed, and Henry R. Cordell made an address which was filled with humor, although he struck a serious note in his discussion of safety.

The second day's business meeting was held in the assembly room of the Ohio Brass Company's general offices. At this session a questionnaire which had been previously mailed to the members of the association was discussed in detail. Several new standards of operation were adopted as a result of general opinion, the most important of which was the adoption of the 27-inch wheel for city service.

At the close of this business session officers for the coming year were elected. In recognition of excellent work done during the past year, A. J. Challeen was re-elected president, and E. J. Jonas vice-president. Following this meeting a luncheon was served in the cafeteria of the Ohio Brass Company. Luncheon was followed by a tour of inspection of the company's foundries and machine shops.

An auxiliary trip of inspection was made on the day before the convention opened by delegates representing thirteen railways. These men started from Cleveland in a bus chartered from the Cleveland-Akron-Canton Bus Lines, going to Sharon, Pa., as guests of the National Malleable & Steel Castings Company.

Digitized by Google

Monthly and Other Financial Reports

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Market Street Railway, San Francisco, Cal.					
March, 1930	809,658	680,035*a*	.....	129,623	72,867
March, 1929	822,436	691,166*a*	.....	131,270	70,626
12 mo. end. Mar., 1930	9,572,827	9,016,971*a*	.....	1,555,856	858,530
12 mo. end. Mar., 1929	9,661,460	.....*a*	.....	1,394,866	655,384
Jacksonville Traction Co., Jacksonville, Fla.					
February, 1930	90,293	68,575	9,069	11,905	.....
February, 1929	96,057	76,164	9,545	8,778	.....
12 mo. end. Feb., 1930	1,132,832	923,458	108,002	95,172	*63,095*
12 mo. end. Feb., 1929	1,187,548	962,346	107,094	111,719	*50,646*
Honolulu Rapid Transit Co., Honolulu, T. H.					
February, 1930	82,620	51,782	8,819	22,968	11,141
February, 1929	84,525	48,624	12,758	24,321	13,100
2 mo. end. Feb., 1930	169,477	106,289	17,638	47,739	24,084
2 mo. end. Feb., 1929	173,132	100,216	25,620	49,696	27,255
Chicago Surface Lines, Chicago, Ill.					
March, 1930	4,792,936	4,529,014	.....	263,922	214,275
March, 1929	5,478,280	4,251,192	.....	1,227,088	222,744
United Railways & Electric Co., Baltimore, Md.					
March, 1930	1,484,031	1,001,977	147,521	349,499	81,082
March, 1929	1,460,771	979,245	151,752	347,648	66,357
3 mo. end. Mar., 1930	4,256,860	2,917,456	420,850	954,994	123,455
3 mo. end. Mar., 1929	4,135,425	2,858,033	418,457	901,495	53,345
Boston Elevated Railway, Boston, Mass.					
February, 1930	2,764,782	1,923,654	135,821	710,118	18,035
February, 1929	2,801,609	2,014,647	143,955	647,064	*53,235*
Department of Street Railways, Detroit, Mich.					
March, 1930	2,032,503	1,676,643	65,099	299,022	149,881
March, 1929	2,443,222	1,990,391	62,545	397,111	265,607
12 mo. end. Mar., 1930	25,473,102	20,331,761	758,622	4,490,703	2,781,689
12 mo. end. Mar., 1929	25,512,219	20,099,836	768,286	4,863,064	3,039,020
Twin City Rapid Transit Company, Minneapolis, Minn.					
3 mo. end. Mar., 1930	3,579,496	2,539,930*a*	.....	1,039,566	433,611
3 mo. end. Mar., 1929	3,763,826	2,666,280*a*	.....	1,097,546	463,036
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
February, 1930	85,460	62,802	4,800	23,562	*7,752*
February, 1929	185,144	60,704	7,840	19,315	*12,084*
2 mo. end. Feb., 1930	180,135	130,820	9,600	50,676	*11,651*
2 mo. end. Feb., 1929	174,367	125,489	15,680	38,358	*24,657*
Brooklyn-Manhattan Transit System, New York, N. Y.					
March, 1930	5,153,556	3,243,489	353,488	1,623,550	849,685
March, 1929	4,222,986	2,638,395	292,482	1,460,286	712,816
9 mo. end. Mar., 1930*d*	45,326,553	30,068,995	2,947,461	12,964,215	5,986,172
9 mo. end. Mar., 1929	36,023,524	23,254,505	2,511,749	11,028,718	4,697,675
Brooklyn & Queens Transit System, New York, N. Y.					
March, 1930	1,970,570	1.525.494	119,617	345,543	224,761
March, 1929	2,071,507	1,687,707	113,695	292,065	164,427
9 mo. end. Mar., 1930	17,653,096	13,878,279	1,033,734	2,931,226	1,800,071
9 mo. end. Mar., 1929	17,952,129	14,880,654	967,260	2,298,088	1,140,789
Hudson & Manhattan R.R., New York, N. Y.					
March, 1930	1,078,807	531,327*a*	.....	547,480	212,760
March, 1929	1,091,214	546,208*a*	.....	545,006	208,945
3 mo. end. Mar., 1930	3,159,261	1,580,962*a*	.....	1,578,299	574,712
3 mo. end. Mar., 1929	3,144,641	1,593,934*a*	.....	1,550,707	543,728
Interborough Rapid Transit Co., New York, N. Y.					
February, 1930	5,758,313	3,530,575	201,846	2,025,891	*291,455*
February, 1929	5,569,751	3,309,333	200,690	2,059,726	267,611
8 mo. end. Feb., 1930	47,915,484	29,911,581	1,614,802	16,389,100	*1,430,964*
8 mo. end. Feb., 1929	45,313,307	28,193,370	1,603,521	15,516,415	1,121,661
March, 1930	6,436,421	3,902,136	262,622	2,271,662	*199,385*
9 mo. end. Mar., 1930	54,351,905	33,813,717	1,877,425	18,660,762	*1,630,349*
New York Railways, New York, N. Y.					
January, 1930	457,586	428,713*a*	.....	28,873	*34,242b*
January, 1929	491,959	463,064*a*	.....	28,895	*33,495b*
February, 1930	410,838	388,816*a*	.....	22,022	*39,964b*
February, 1929	446,822	417,000*a*	.....	29,822	*46,758b*
2 mo. end. Feb., 1930	868,424	817,530*a*	.....	50,894	*74,196b*
2 mo. end. Feb., 1929	938,781	880,062*a*	.....	58,719	*80,243b*
New York, Westchester & Boston Ry., New York, N. Y.					
February, 1930	189,794	109,845	24,715	55,787	*171,766*
February, 1929	173,549	121,483	19,686	33,003	*169,087*
2 mo. end. Feb., 1930	401,117	232,486	49,023	120,880	*338,261*
2 mo. end. Feb., 1929	364,384	252,335	38,480	74,914	*341,704*
Third Avenue Railway, New York, N. Y.					
February, 1930	1,138,330	885,472	85,384	185,456	*53,211*
February, 1929	1,173,098	909,000	83,206	298,882	*58,721*
8 mo. end. Feb., 1930	10,064,774	7,780,159	710,235	1,731,054	*307,063*
8 mo. end. Feb., 1929	10,223,779	7,914,433	725,021	1,734,552	*307,244*
Philadelphia Rapid Transit System, Philadelphia, Pa.					
3 mo. end. Mar., 1930	13,830,657	10,573,137*a*	.....	3,459,279	3,219,229
Galveston-Houston Electric Railway, Houston, Texas					
February, 1930	40,121	22,843	2,604	14,676	.....
February, 1929	46,575	25,045	2,567	18,961	.....
12 mo. end. Feb., 1930	572,912	324,854	32,477	215,773	*52,988*
12 mo. end. Feb., 1929	635,463	361,211	31,730	242,520	*28,523*
Houston Electric Company, Houston, Texas					
February, 1930	259,882	165,109	22,505	72,268	.....
February, 1929	264,573	168,729	25,233	70,610	.....
12 mo. end. Feb., 1930	3,360,970	2,076,664	269,119	1,033,052	635,647
12 mo. end. Feb., 1929	3,355,195	2,081,378	290,707	983,109	571,573
Pacific Northwest Traction Co., Seattle, Wash.					
February, 1930	72,097	56,359	4,050	11,685	.....
February, 1929	64,336	58,856	3,571	1,906	.....
12 mo. end. Feb., 1930.	979,000	710,943	54,879	213,176	97,510
12 mo. end. Feb., 1929	878,212	746,357	51,311	80,543	*63,137*
Calgary Municipal Railway, Calgary, Alta.					
2 mo. end. Feb., 1930	181,756	107,046	.....	74,710	22,611
2 mo. end. Feb., 1929	.....	.....	.....	.....	30,020
Edmonton Radial Railway, Edmonton, Alta.					
February, 1930	75,916	45,917	.....	29,998	2,771
February, 1929	76,979	43,343	.....	33,636	5,288
2 mo. end. Feb., 1930	161,151	98,939	.....	62,211	5,098
2 mo. end. Feb., 1929	156,092	89,601	.....	66,490	8,794
Ontario Hydro-Electric Rys., Essex District, Windsor, Ont.					
3 mo. end. Jan., 1930	293,370	235,863	1,403	56,104	*35,890*
3 mo. end. Jan., 1929	.....	.....	.....	.....	27,641*c*
Saskatoon Municipal Railway, Saskatoon, Sask.					
2 mo. end. Feb., 1930	87,823	51,688	3,474	32,661	7,726
2 mo. end. Feb., 1929	.....	.....	.....	.....	15,714

a Includes taxes. *b* Before adjustment bond interest. *c* Before renewals. *d* Includes Brooklyn & Queens Transit System.

Paris Subway System Expands

EXTENSIVE additions to the Paris subway system, or the "Metropolitan," as it is better known, are under way. In order to reach certain sections in the city which have been inadequately served, some 31 km. (19.2 miles) of lines are being constructed. The program has been accelerated on account of the Colonial Exposition which will be held next year in the Bois de Vincennes. Besides these, the demolition of the ancient fortified wall has removed the barrier to expansion of the city and has created a demand for rapid transit to the centers of the adjacent communities. The Department of the Seine, by action of Dec. 24, 1929, created a transportation district enabling the extension of subway lines beyond the old limits established by the walls. In all, fifteen projects for extensions have been made, totaling 33 km. (20.5 miles), and carrying most of the existing routes beyond their present terminals at the city gates.

The Nord-Sud subway company, which originally was independent, has been merged with the Metropolitan, and on Jan. 1 of this year became an integral part of that system. In general, the routes of the Nord-Sud are non-competitive and serve to extend the network of subway lines which cover Paris. The total length of existing lines, including the Nord-Sud, is now approximately 123 km. (76.3 miles).

The principal construction within the city will be extensions of Routes 8 and 9 under the Grand Boulevards from the Opéra and Chaussée d'Antin stations, where they respectively terminate, to Place de la République, in a two-level, four-track subway. From there Line 8 will continue to the Bois de Vincennes at the entrance to the exposition.

Another important piece of construction being carried on is the extension of Route 7 from Ponte Marie, under the Seine to Place d'Italie, and thence to the borough hall of Ivry. Route 10 is being extended from the Odéon to Place Jussieu, with a connection to the extension of Route 7 at Place Monge.

The construction in general is of reinforced concrete with an arch type roof, a single tunnel containing the two tracks. The sections under the Seine and along its banks are of the cast-iron sectional type.

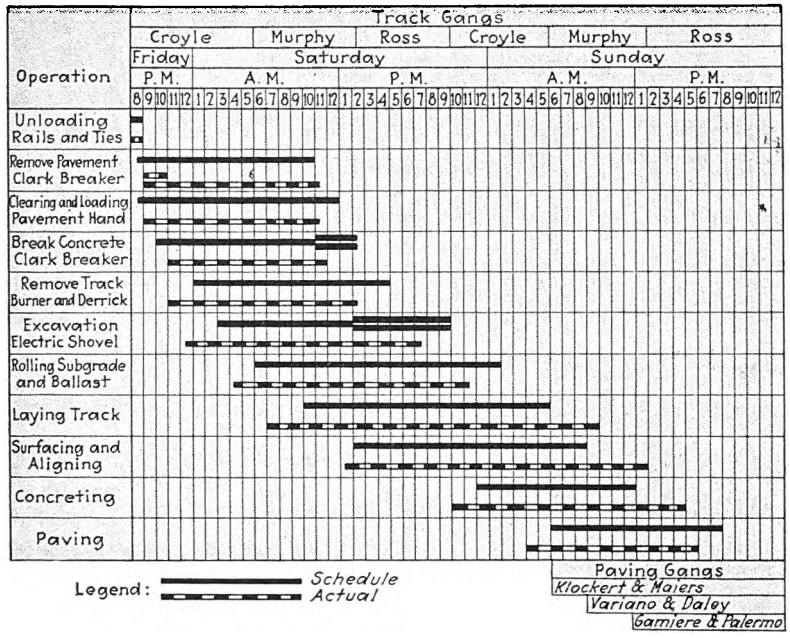
Digitized by Google

Digitized by Google

Track Reconstruction

Replacement of 1,200 lin. ft. of track on Euclid Avenue in business section of Cleveland was completed in 49 hours. Breakdown of equipment during work was avoided by careful inspection prior to start. Operations were arranged to follow each other in close sequence. Vehicular traffic suffered no interruption

By
H. H. GEORGE
Superintendent of Way
Cleveland Railway

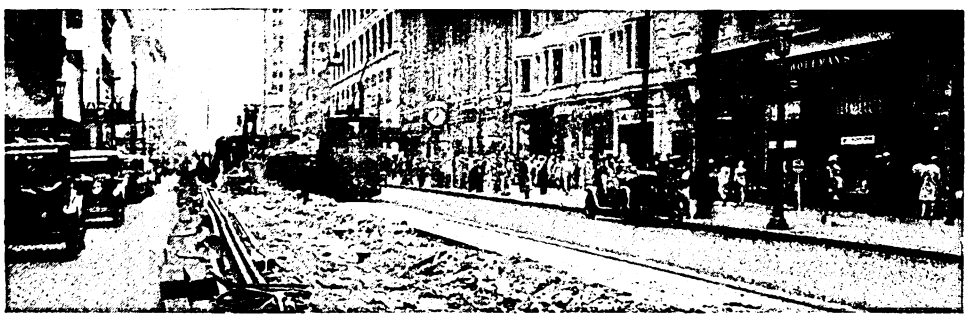


Operations were scheduled to follow each other in close sequence

had been placed on a thoroughly rolled subgrade, and then this slag also rolled to a depth of 8 in. The tamping of the track and surfacing was done with 2 in. of fine slag, dampened to assist in compacting under the ties. The track was concreted between ties and to the top of the rail clips, and was paved with granite block. The blocks along the outside of the outer rail of each track were bedded directly in green concrete and also backed up with concrete to the depth required for abutting asphalt pavement outside the track area.

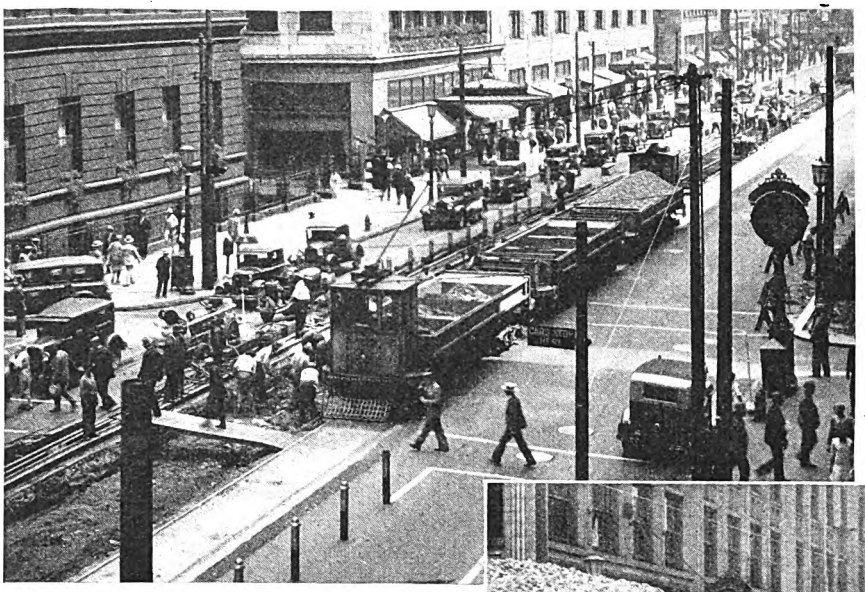
The main retail business stores in the territory affected were closed on Saturdays during the month of August, and plans were accordingly made to do the work during that month. The eastbound track was rebuilt first, work being started at 8 p.m. on Friday, Aug. 2, and the final pavement of the new track was completed at 9 p.m. on Sunday, Aug. 4. The work on this first track included the removal of the pavement and its concrete base in the devilstrip, but did not include the repavement of the devilstrip. The work on the second track started at 8 p.m., Friday, Aug. 9, and the last pavement of the track, including the entire devilstrip, was completed at 6 p.m. on Sunday, Aug. 11. During reconstruction, the cars were rerouted over tracks located one block south of their regular route, but the movement of vehicular traffic on Euclid Avenue was not interrupted for a single minute in either direction. A great deal of credit was due the city Police Traffic Department for its co-operation in enforcing temporary no-parking regulations and in keeping through traffic moving.

The scheduling of the various operations required the most carefuly study and consideration of the limitations of each piece of equipment. It meant a thorough check of the mechanical condition of the equipment to guard against and minimize the possibility of delay in the schedule due to breakdown of equipment. The wisdom of such a check was proved during the course of the two week-end operations, no



Electric shovel digging out the old track

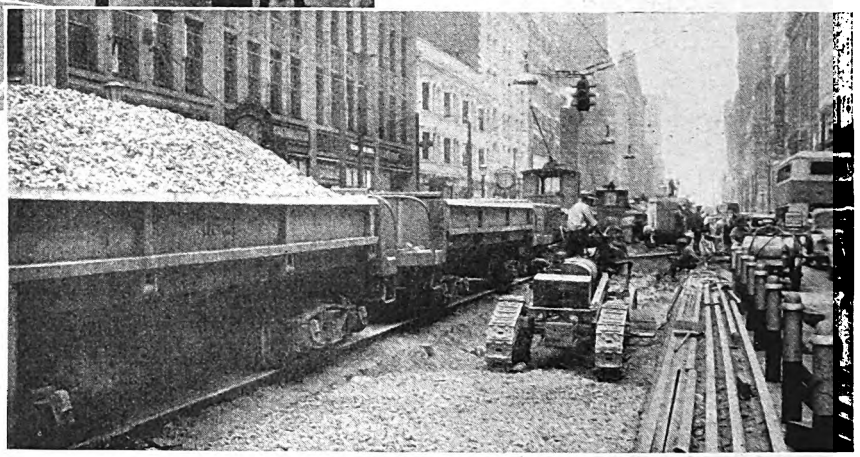
Digitized by Google



Work train delivering material

Summary of Man and Equipment Time

Total cost—material	$20,845.34
—labor	12,021.66
Total	$32,867.00
Total number of feet, single track	2,403.4
Average cost of lineal foot	$13.68
Man-hours required	15,772
Motor-truck hours	280
Work-car hours	1,633
Derrick-car hours	210
Air-compressor hours	372½
Acetylene-burner hours	145
Clark concrete-breaker hours	144
Electric-shovel hours	259
Roller hours	32
Power-grader hours	28
Rail-grinder hours	120
Concrete-mixer hours	77
Welding-machine hours	394
Thermit-welding hours	51



Concentration of mechanical equipment permitted speedy work

breakdown occurring during the first week-end and only one during the second, this being the failure of a concrete mixer, which involved a loss of time of two hours in this and subsequent operations.

From a study of the accompanying schedule chart, it will be seen that each operation was scheduled to follow the preceding one in a regular sequence and in close order. Each gang was continually pressing the operation ahead of it to keep out of the way, and was constantly on its toes to keep out of the way of the gang behind it. The tabulation shows how the three eight-hour shifts were scheduled to take up where the previous gangs left off, and also how all equipment was scheduled for arrival at the job. The deviation from this schedule was surprisingly small.

Pertinent figures for these operations are given in the following table. In this connection it should be noted that, in each case, the hours given represent a 25 per cent excess over actual hours worked, this being the bonus given all hourly labor on the job as a premium both for speed and for the fact that these men worked steadily through the rain, nights and on Sunday. It was felt that the over-time allowance was fully justified and well earned. The base rate for labor was 55 cents per hour. The over-time represented an extra labor cost of exactly $1 per foot of track rebuilt. In each instance the equipment hours reported included all idle or waiting time.

Schedule of Euclid Avenue Reconstruction Work

(Westbound Track)

TRACK GANGS

Foreman	Number of Sub-Foremen	Number of Laborers	Starting Time	Starting Date	Finishing Time	Finishing Date
J. Croyle	4	60	8 p.m.	Aug. 9	6 a.m.	Aug. 10
J. Murphy	5	65	6 a.m.	Aug. 10	2 p.m.	Aug. 10
C. Ross	3	60	2 p.m.	Aug. 10	10 p.m.	Aug. 10
J. Croyle	4	60	10 p.m.	Aug. 10	6 a.m.	Aug. 11
J. Murphy	5	65	6 a.m.	Aug. 11	2 p.m.	Aug. 11

PAVING GANGS

	Pavers					
M. Klockert	8	18	6 a.m.	Aug. 11	.....	Aug. 11
J. Maiers	7	18	6 a.m.	Aug. 11	.....	Aug. 11
J. Verriana	7	13	9 a.m.	Aug. 11	.....	Aug. 11
W. Daley	7	12	9 a.m.	Aug. 11	.....	Aug. 11
D. Palermo	7	15	12 m.	Aug. 11	.....	Aug. 11
J. Gamiere	7	15	12 m.	Aug. 11	.....	Aug. 11

EQUIPMENT

	Time on Job		Start		Finish	
Derrick (new rail)	8 p.m.	Aug. 9	8 p.m.	Aug. 9	9 p.m.	Aug. 9
Derrick (new rail)	8 p.m.	Aug. 9	8 p.m.	Aug. 9	9 p.m.	Aug. 9
Air compressor	8.30 p.m.	Aug. 9	8.30 p.m.	Aug. 9	10 a.m.	Aug. 10
Clark breaker No. 1	8.30 p.m.	Aug. 9	8.30 p.m.	Aug. 9	2 p.m.	Aug. 10
Clark breaker No. 2	8.30 p.m.	Aug. 9	8.30 p.m.	Aug. 9	4 p.m.	Aug. 10
Burning car	10.30 p.m.	Aug. 9	10.30 p.m.	Aug. 9	4 p.m.	Aug. 10
Derrick (old rail)	10.45 p.m.	Aug. 9	10.45 p.m.	Aug. 9	6 p.m.	Aug. 10
Shovel	12 m.	Aug. 9	2 a.m.	Aug. 10	9 p.m.	Aug. 10
Roller-grader	2 a.m.	Aug. 10	4 a.m.	Aug. 10	1 a.m.	Aug. 11
Concrete mixer	11.30 p.m.	Aug. 10	12 p.m.	Aug. 10	4 p.m.	Aug. 11

BILL OF MATERIAL

Material	Quantity	Cars	Material	Quantity	Cars
Slag, 3 in.	350 tons	19	Bolts	2 kegs	..
Fine slag for tamping	100 tons	6	Rods (tie)	204 only	..
Ties (drilled)	530 only	..	Gravel (plus outside)	400 tons	15
Ties (blank)	84 only	..	Cement	1,700 bags	..
Rail	1,211 feet	2	Block (granite)	1,250 sq.yd	13
Plates (tie)	1,142 only	..	Block, granite (headers)	105 sq.yd	1
Plates (joint)	42 only	..	Slag (fine), pavement	90 tons	5
Spikes (screw)	14 kegs	..	Sand	63 tons	3½
Clips	13 kegs	..	Special flat steel tie plates, ½-in.	20 only	..
Splices	42 pair	..			

Digitized by Google

Use of Dynamometer Successful in Stringing Trolley Wire

Experience in Cleveland shows that correct tensions can be obtained by testing when the wire is cut in. Failures experienced have been very few since this method has been used

By ANGUS G. SCOTT
Assistant Superintendent of Overhead Lines
Cleveland Railway

ALL trolley wire on the Cleveland Railway is strung with the use of a dynamometer. Under climatic conditions in that city it has been found very satisfactory to use this method, and the appearance of the overhead indicates that the tensions obtained are very uniform.

One important point to observe in stringing wire is to have a tension sufficient to provide a good running surface for the trolley wheel, and yet not to exceed the elastic limit of the wire. Under no circumstances should the ultimate strength be exceeded, even in the most severe weather likely to be encountered in winter. In order to be sure that the tension is kept at the proper point, a table has been worked out for copper and for phono-electric wire, calculated for 85 deg. from 30 deg. F. to 90 deg. and for 10, 20 and 100 deg. Table I, which appears with this article, gives the calculated tension to which the trolley wire must be drawn when it is erected.

It will be remembered that as the temperature rises the wire will increase in length and if the temperature falls it will decrease. Accordingly, when the wire expands the tension will decrease, and when the wire contracts it will increase. The temperature-tension table included herewith has been figured to compensate for this change of tension with temperature. For instance, standard hard-drawn trolley wire, strung at 60 deg. F. should be pulled to a tension of 1,700 lb. If the temperature falls to 10 deg. the tension in the wire will increase to about 2,500 lb. If the temperature falls to zero or below, wire less than 0.25 in. in diameter or equal to the opening in the No. 00 gage furnished the line crew will pull apart and break.

When the wire is pulled to tension with the dynamometer it is necessary to exercise care to bring it to the value indicated in the table. If the tension is increased, the wire will reach its breaking strength at a higher temperature. Accordingly, wire which has been worn to a diameter of 0.25 in. would not be safe at temperatures reached in the climate of Cleveland. On the other hand, if the tension is decreased the wire will be too slack and will wear out quickly.

The dynamometer used in stringing wire is of the Chatillon spring type. This dynamometer has a small range of error, one calibrated showing 50 lb. high on a 2,500-lb. pull and increasing in a constant ratio. For convenience in handling, each dynamometer is carried in a box made for it, along with a special link having a double clevis for attaching to the dynamometer and to the clamp which is fastened to the wire. The box also contains a thermometer for ascertaining temperature at the time the tension is read.

Table I—Trolley Wire Tension to Be Obtained by Use of Dynamometer

Temperature Deg. F.	No. 00 Gage Copper	No. 00 Gage Phono-electric	No. 0000 Gage Copper
10	2,500	2,950	3,900
20	2,350	2,750	3,650
30	2,200	2,550	3,425
35	2,100	2,450	3,325
40	2,000	2,350	3,200
45	1,925	2,250	3,100
50	1,900	2,150	3,000
55	1,825	2,050	2,900
60	1,700	1,950	2,750
65	1,625	1,850	2,550
70	1,550	1,750	2,400
75	1,475	1,700	2,275
80	1,400	1,600	2,100
85	1,325	1,500	2,000
90	1,250	1,400	1,900
100	1,100	1,200	1,625

When the tension on the wire is to be tested where already in service, one side of the dynamometer is attached to the wire, using the special clamp and link which is provided for the purpose. Blocks are attached to the dynamometer and are pulled steadily until the first slack appears. The dynamometer is then to be held at this point and the scale is read. This procedure is followed whenever it is desired to ascertain if the wire is maintained at the proper tension.

When new wire is being pulled to tension, the same procedure is followed, except that care must be taken not to pull the wire far beyond the desired tension, nor to lose any of the tension while cutting in the spliced or dead ends. It also is essential not to jerk the wire while pulling it in to tension. The wire is pulled up to about 50 lb. more than the desired tension to allow for slacking off in attaching.

Since it is essential that the tension be made to correspond with the one which has been figured out for the particular temperature at which the wire is installed, particular emphasis is laid on the necessity of reading the thermometer whenever the dynamometer reading is

Digitized by Google

taken. If this is not done, the accuracy of the plan is sure to fail.

Another precaution that must be taken to insure against damage is that the wire must not be pulled to tension on curves, in intersections, or against badly worn trolley wire, until an inspection has been made. If a wire remaining in place appears to justify, the new wire may be pulled to tension. The lineman must use his judgment in doing this. For instance, it is unwise to pull No. 0000 wire to tension at the point where it connects with No. 00 standard wire. Instead, it is necessary to absorb

Table II—Relation Between Breaking Strength and Wear for No. 00 Wire, Phono-electric and Copper

Diag.	Vertical diameter of worn wire, mils	Area, sq.in.	Copper		Phono-Electric	
			Breaking strength, lb.	Condition	Breaking strength, lb.	Condition
	364.8	0.1046	5,520	New	8,200	New
	300	0.08108	4,280	Good	6,360	Above new copper
	275	0.07214	3,810	Fair	5,650	Still above new copper
	250	0.0633	3,340	Dangerous	4,960	Above good for copper
	200			Renew wire		
	200	0.0466	2,460	Down	3,650	Dangerous
	150	0.0311	1,640	Down	2,435	Must come down

Maximum life, No. 0000 wire: Breaking strength 4,400 on maximum. Vertical diameter 300 mils to 285 mils.

Maximum life, No. 00 wire: Breaking strength 2,900 on maximum. Vertical diameter 230 mils. Area 0.055 sq.in.

enough of the tension on the No. 0000 wire, by attaching the fitting before splicing it into the No. 00 wire. By following these simple instructions no difficulty has been experienced in the use of the dynamometer in stringing wire.

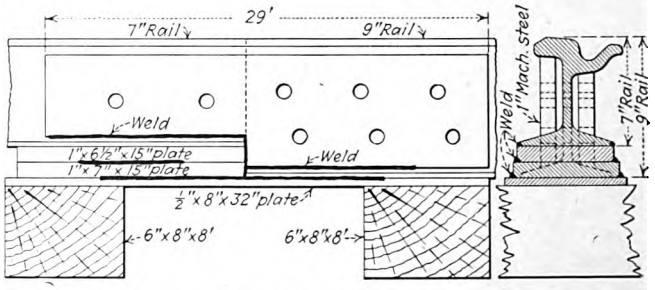
When Wire Should Be Renewed

In determining whether worn wire is to be renewed or not, reference is made to a chart which has been prepared for the purpose. This chart is reproduced herewith. It will be noted that copper wire is given four classifications: New, good, fair, dangerous. When the vertical diameter of the No. 00 wire is less than 200 mils, it must be renewed. High-strength phono-electric wire, it will be noted, has a much greater breaking strength and may be allowed to remain in the line until it reaches a considerably smaller diameter than the copper wire. Phono-electric wire of 150 mils vertical diameter must be renewed.

Built-Up Compromise Joint*

By H. Bragg
Principal Assistant Engineer
United Railways & Electric Company
Baltimore, Md.

SATISFACTORY results have been obtained in Baltimore from the use of a compromise joint made by placing a baseplate to span the space between the ties, and built up under the low rail with plates. The baseplate, liftplates and base of the rail are welded together



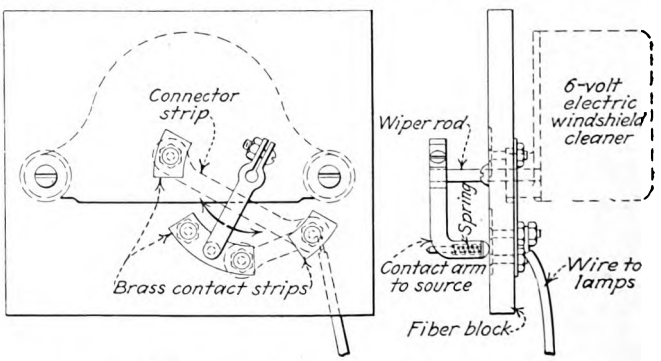
Compromise joint with baseplate spanning space between two ties and low rail supported by two liftplates

by the electric arc process. An accompanying illustration shows a compromise joint recently made where a 9-in. rail was joined with a 7-in. rail. Varying widths of plates are used to provide the necessary welding shelf.

Flashing Danger Lights on Tower Trucks*

By H. A. Brown
Foreman Return Circuit, Switch and Signal Division
Cleveland Railway

TOWER trucks of the switch and signal division of the Cleveland Railway have been equipped with a device which flashes all of the electric danger lights mounted on the vehicle. These lights are intended to prevent collisions when repairs are made at night on the overhead construction. The flasher was made from an



Electric windshield wiper is used as flashing apparatus for the red lights on trucks of the Cleveland Railway

old 6-volt windshield wiper which was provided with contacts mounted on a fiber block and placed below the wiper in such a manner that each sweep of the wiper arm makes and breaks the circuit to the red danger lights. The device is mounted in a water-tight box placed beneath the floor board, where it is out of the way. It is controlled by a conveniently placed snap switch.

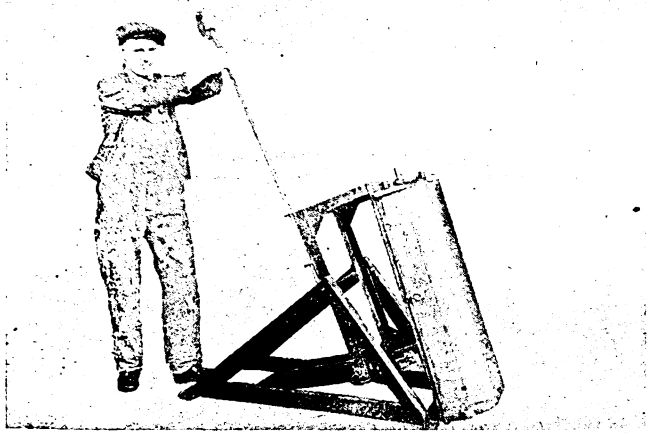
*Submitted in Electric Railway Journal Prize Contest.

Digitized by Google

Tilting Bench for Controller Repairs*

By E. J. Jonas
Superintendent of Equipment Cincinnati Street Railway

INSTEAD of installing a hoist to raise controllers to the overhaul bench, the Cincinnati Street Railway has devised an adjustable stand upon which the controller is placed in a nearly vertical position, and which is then tilted until the controller is in a horizontal position 40 in. above the floor. The framework consists of two triangular sides made of angle iron, with a cradle for the



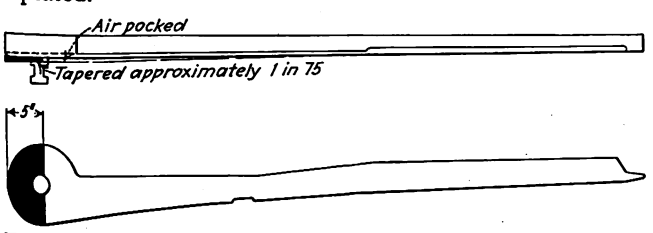
Tilting controller workbench used in shops of the Cincinnati Street Railway

controller pivoted between the upper apexes of the side numbers. The cradle is provided with a flange at one end upon which is placed the bottom of the controller to be overhauled. The shopman then raises the controller to a horizontal position by means of a lever, and inserts a pin to hold the cradle stationary. This device has an advantage over a fixed workbench and hoist in that it can easily be moved to any desired location in the shop.

Switch Tongues Built Up by Welding*

By G. E. Picklesimer
Supervisor of Switches and Signals Roadway Department Georgia Power Company

SWITCH tongue heels of the Georgia Power Company are kept up to the surface of the rail by inserting shims as needed. When the heel is worn about $\frac{1}{4}$ in. the tongue is taken out and the under side of it built up with $\frac{3}{16}$ in. high-carbon steel, hammering the hot metal down to a taper of approximately 1 in 75, depending on the length of the tongue. The tongue is then allowed to cool, after which it is ready for service until it is worn to such an extent that this operation must be repeated.



Worn switch tongues are repaired by welding shim to under side

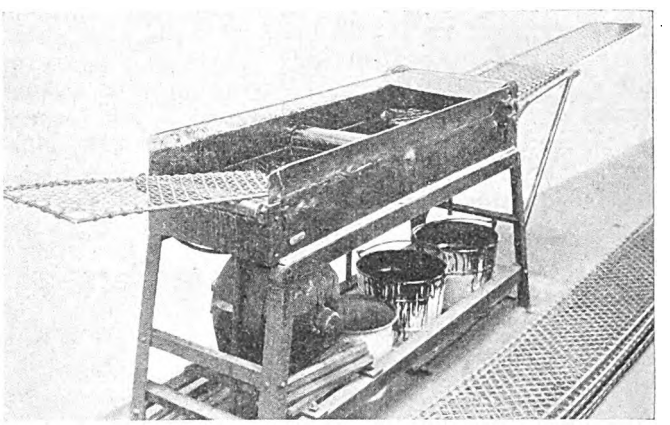
It will be noted that an air pocket is left under the tongue and just forward of the pin. This is done so that whole shims of the same diameter as the heel of the switch, can be used. Otherwise it would be necessary to use half shims at the heel of the tongue and this would be very unsatisfactory as they soon work out of place. If the entire heel of the tongue were built up and a whole shim used it would not give the bearing at the heel which is desired.

The Georgia Power Company has at present 300 switch tongues which have been built up by this welding method and are giving satisfactory service, not causing any trouble except for the occasional installation of shims. This method of building up was inaugurated in 1923 and until that time switch tongues had to be inspected weekly in order to adjust the shims.

Window Guard Painting Machine*

By Terance Scullin
Superintendent Buildings and Equipment Cleveland Railway

FASTER painting of wire-mesh window guards is now done in the paint shop of the Cleveland Railway by means of a simple device which both dips and brushes the paint on the screen. The window guard is pushed by hand into the right end of a trough, as shown in an accompanying illustration, down underneath the roller into the center of the tank, which immerses it completely in the bath. Further pushing brings the guard in contact with the sloping bottom, which directs it up and out of the paint between two motor-driven brushes, rotating at 120 r.p.m. From this point the guard is pulled through the rest of the way from the opposite end and



Window guards are painted at a rate of 3½ sets per hour by one man using this machine in the shops of the Cleveland Railway

then hung up to dry. Dipping alone would leave an excess amount of paint on the guard, forming beads when dry, then when the surface of any of these beads was broken fresh paint would be exposed, spotting any clothing with which it came into contact. Brushing aids in preventing damage claims from this cause. Previously, all window guards were painted by hand, one side at a time. This method was exceedingly slow and not nearly as thorough as the present system. A workman with this machine can paint 3½ sets of window guards in an hour, where formerly it required one man 2¾ hours for a set. The approximate cost of this machine is $25, exclusive of the motor.

**Submitted in* Electric Railway Journal *Prize Contest.*

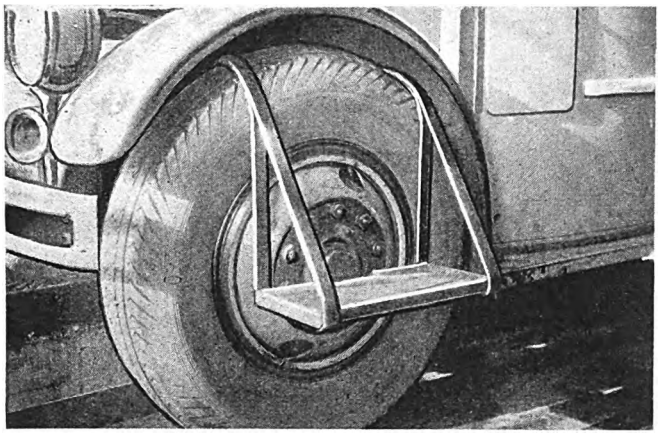
Digitized by Google

Stand Facilitates Bus Motor Adjustment*

By Hoy Stevens

Superintendent of Maintenance Motor Coach Department
Cleveland Railway

IN ORDER to facilitate motor and general repair work on heavy-duty high-capacity coaches, such as the White 54A or the Yellow Z240, the mechanic's stand illustrated has been developed by the bus division of the Cleveland Railway. The dash and front fender construction of large buses make it impossible for a mechanic standing on the floor to lean over or between the fender and body and do any work on the motor.



For making adjustments on motors of large buses a stand for the mechanic has been made in the shops of the Cleveland Railway

This stand is so built that it can be mounted on the front wheel over the tire. Due to its small size and the cut-out in the center for the hub cap of the wheel there is little or no danger of slipping. It makes a convenient, safe and portable stand for the mechanic while making repairs or adjustments, placing him in a position where he can reach the motor and other units with little difficulty. The step is not expensive and it has been found valuable in making minor operating repairs.

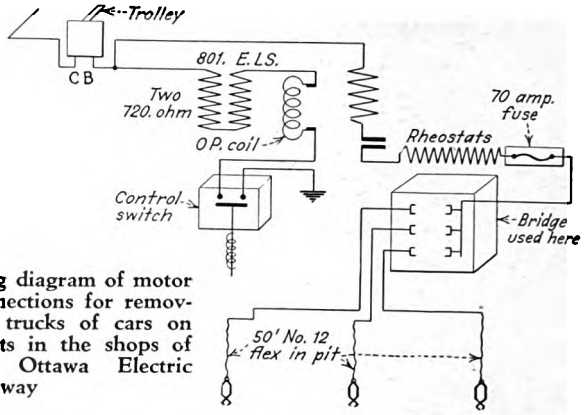
Removing Trucks from Cars on Hoists*

By J. Munford

Electrical Foreman Ottawa Electric Railway

CONVENIENT apparatus for moving trucks out under power from beneath cars on hoists in the shops of the Ottawa Electric Railway has been designed, a spare 801-E-4 line switch and some old car resistance units being used. The switch and resistance units are placed under the platform of the middle pit of the three which are in the shop. A hand-operated control is placed on a pit column where a clear view of the three pits can be had. Cable runs from the junction box in conduit sunk in the cement floor to the three pit outlets. From there a 50-ft. piece of No. 12 flexible wire is connected to the cutout lead on the motor by means of a battery clamp. A reversing switch, made from a K-10 reverse cylinder cut in half, is mounted with fingers and chairs to a portable board with an iron back, which is hooked onto the side of the truck frame to give a ground connection. Three flexible leads each 3 ft. long are provided, with battery clamps attached, connecting to the three remaining motor leads. A kick on the cross-bar, which is welded to the cylinder shaft, is sufficient to reverse the trucks. This apparatus has been in constant use in the shops for two years and has given very satisfactory service.

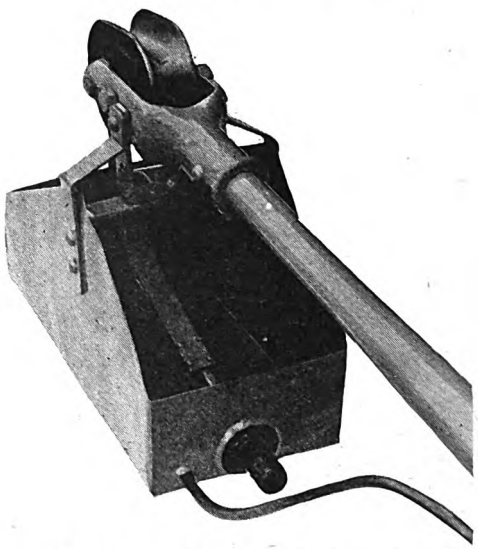
Submitted in Electric Railway Journal Prize Contest.



Wiring diagram of motor connections for removing trucks of cars on hoists in the shops of the Ottawa Electric Railway

Pressure Lubrication of Overhead Trolley Wire

MARKED success has attended the use by the Eastern Michigan Railways of a new method of lubricating overhead trolley wire. The apparatus used for this purpose consists of a spray nozzle attached to the trolley harp of a line car and connected by flexible hose with a reservoir tank at one end of the car body. A pressure of 20 lb. per square inch is maintained in the reservoir by tapping the regular air supply of the car. Under the trolley harp a receptacle is provided to catch any excess lubricant. The lubricant itself, called "Lubrion," is made in the form of paste, which is mixed with water in the amount of 1 lb. to 1 gal. After being sprayed on the wire the water evaporates leaving a dry deposit, which neither collects dust and grit nor acts as an insulator, as compounds containing oil or grease sometimes do. The lubricant is manufactured by the Efficiency Products Company, Detroit.



Apparatus used by Eastern Michigan Railways for applying lubricant to trolley wire, showing receptacle to catch excess liquid

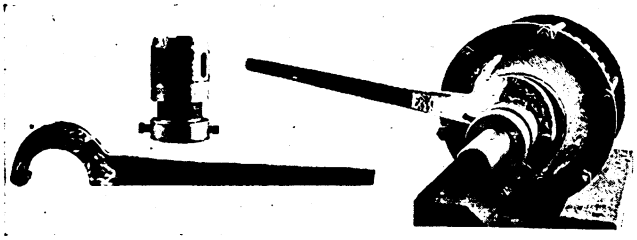
Digitized by Google

Special Armature Nut Wrench

By W. R. McRae

Superintendent of Rolling Stock and Shops
Toronto Transportation Commission

A SPECIAL sleeve wrench has been designed for service in the shops of the Toronto Transportation Commission, for the removal of GE-80 armature body nuts. The top part of sleeve is cut out to fit over projections in the armature nut, and is also threaded on to the lower part, the latter being held firmly to shaft by means



Special wrench developed by the Toronto Transportation Commission for removing armature nut from GE-80 motor

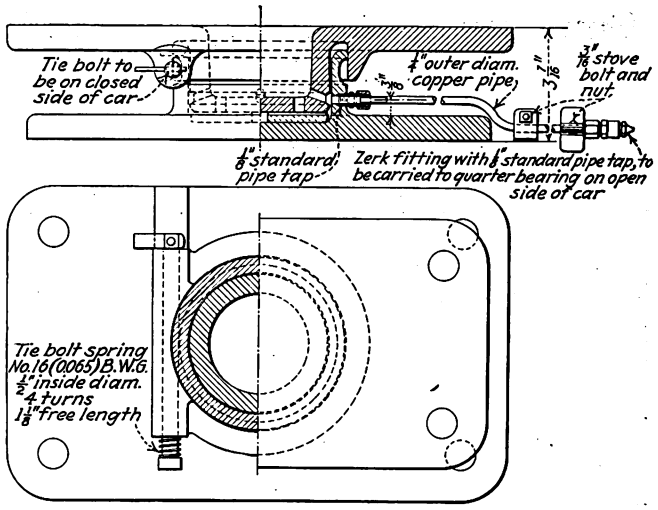
of two set screws. The thread on the sleeve has the same pitch as the armature nut, so that when the wrench grips the slots in the sleeve and turns, the top part of sleeve screws on to the lower fixed portion, as the nut loosens. The old method of removal of these nuts caused considerable breakages, whereas the method described eliminates breakage and is a great time saver.

Center Bearing Lubrication Simplified

By H. S. Williams

Assistant Superintendent of Equipment
Department of Street Railways, Detroit

LUBRICATION of center bearings of car trucks is made easy by a method developed by the Department of Street Railways, Detroit. In the type of bearing to which this method has been adapted, no king pin is used. The bearings are locked together by means of a horizontal pin of cold rolled steel which occupies a groove turn in the lower half. The purpose of this is to prevent the entrance of grit to the bearing surface as the plate has been made of case-hardened steel ground smooth. The lower half of the center bearing is provided with a copper tube which leads outward to the extreme end of the thrust bolster. This outer end of the tube has a Zerk fitting. All that is then necessary to apply the lubricant is a Zerk gun. A central chamber



Zerk fitting used by Department of Street Railways, Detroit, for lubrication of truck center bearings

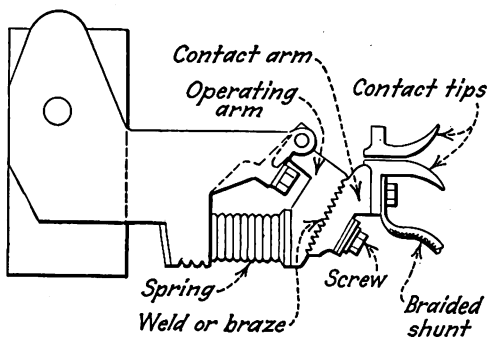
is provided with holes leading from the bearing surfaces so that any excess oil will tend to flow into this chamber, thus giving the added advantage of an oil reservoir. For this reason it is important that a groove be turned in the upper member of the center bearing opposite the oil groove opening. Unless this is done, it is possible that the oil tube will become plugged.

Preventing Loose Breaker Tips*

By E. C. McGinnis

Electrical Foreman
Dallas Railway & Terminal Company, Dallas, Tex.

CAR failures have sometimes occurred in Dallas when the lower contact arm of a line breaker came loose. In the type of breaker with which this has happened the contact arm is bolted to the operating arm to form a unit



By welding the lower contact arm of the line breaker to the operating arm, a source of failures has been eliminated in Dallas

which swings upward to close the circuit. The abutting surfaces are corrugated to make possible adjustment for wear of the contact tips, the two parts being held together with a capscrew and lock washer. Continued operation loosened the screw, allowing the contact arm to drop down and prevent closing of the circuit.

It was found that the tips wear out before an adjustment is necessary. Accordingly, it was decided to braze the contact arm permanently in place against the operating arm and dispense with the adjustment. This method has been found satisfactory, and has eliminated a source of trouble.

**Submitted in* Electric Railway Journal *Prize Contest.*

Final period of

Maintenance Contest

begins May 1

You have three more months to get in the running for the Annual Awards.

Don't delay. Send in your ideas at once.

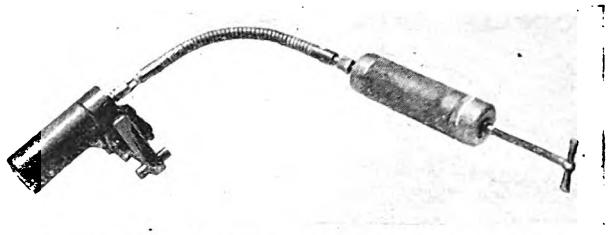
Digitized by Google

Gun Used for Electric Track Switch Lubrication*

By H. A. Brown

Foreman Return Circuit, Switch and Signal Division
Cleveland Railway

PROPER lubrication of the electric track switch mechanism located in the ground box has been facilitated on the Cleveland Railway by use of a specially designed lubricator for the levers and bushings. The bushings are sealed at the bottom by welding them to a circular steel disk. A hole $\frac{1}{8}$ in. in diameter is drilled through the center of the lever pin and tapped on the upper end to accommodate an Alemite grease fitting. When the parts are assembled, grease is forced down under pressure through the center of the lever pin and up between the outer surface of the lever pin and the bushing in a manner similar to that followed in greasing automobile shackle bolts. This method of lubrication has proved very satisfactory in service, forcing out all collected dirt, preventing water from entering the bushing, permitting a much closer adjustment of the mechanism, and providing thorough lubrication without the removal of the various parts.

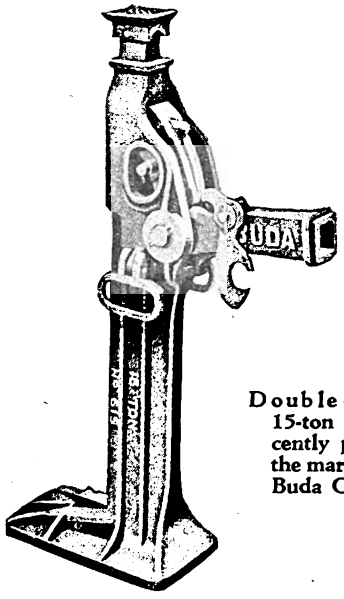


Alemite grease gun for lubricating electric track switches on the Cleveland Railway

New Products for the Railways' Use

New Ratchet Jack

THE Buda Company, Harvey, Ill., has just placed on the market a new ratchet jack, known as No. 615, which replaces the old style Buda No. 6. This new jack, furnished primarily for heavy section or extra gang service, is of 15-ton capacity, double acting, 31 in. high with a $20\frac{1}{2}$ in. rise.



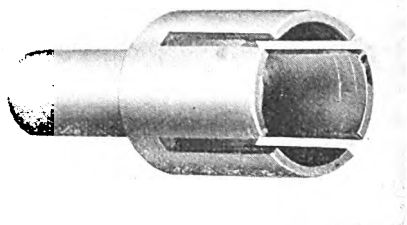
Double-acting, 15-ton jack recently placed on the market by the Buda Company

This jack weighs only 88 lb., having fewer parts than the old-style jack. The lever sockets are cast integral with the side plates. The lever socket is made of electric cast steel, heat-treated.

The new design has a special safety feature, in that the stop for the rack bar is located in the base of the jack, thereby avoiding the possibility of the operator mashing his fingers between the top of the rack and the frame.

Terminal for Brush-Holder Leads

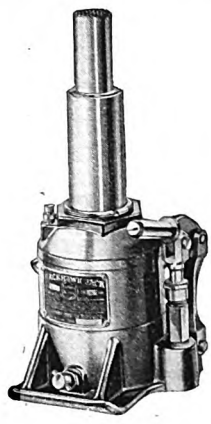
A NEW cable terminal has been developed by the Westinghouse Electric & Manufacturing Company to strengthen the leads where they enter the brush holder. The breaking of leads at this location is frequently due to the cable becoming nicked while removing the insulation. At this point stresses are concentrated and in time slight movements of the leads during service will cause failure to occur. One end of the new terminal is made large enough to fit over the insulation of the cable. This part of the terminal has four saw cuts which permit it being clamped to the cable. The bending which takes place in the lead to that part outside of the terminal is thus localized and prevents the cable from bending and breaking at its weakest point. The small end has an inside diameter sufficient to take care of the diameter of the bare cable and an outside diameter of the proper size to fit into the brush holder. It is important that the large end of the terminal be clamped to the cable so as to hold it securely, otherwise the cable will not be strengthened and the trouble with broken leads may occur.



Cable breakages are avoided with this new terminal for brush-holder leads developed by the Westinghouse Electric & Manufacturing Company

Low Jack for Raising Buses

A FIVE-TON hydraulic jack which is $7\frac{5}{16}$ in. high when collapsed has recently been placed on the market by the Blackhawk Manufacturing Company, Milwaukee, Wis. This is known as Model M-7.3. A telescopic lift of $7\frac{3}{16}$ in. gives a total height of $14\frac{1}{2}$ in. To facilitate placing and removing, the jack is provided with a sled base and with a lantern type handle which gives it a comfortable grip. The saddle is serrated and forms an integral part with the plunger. The total weight is



Hydraulic 5-ton jack with sled base and lantern-type handle suitable for lifting low axle buses

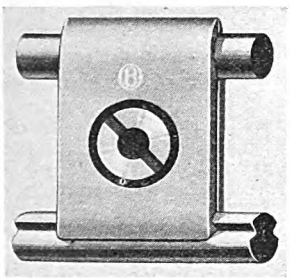
Digitized by Google

25½ lb. with a 34-in. two-piece handle.

A heavier type jack, the D-8.7, is designed to lift 12 tons and is 8¾ in. high. It has a single lift of 5 in. and a 3-in. handscrew extension, or a total height of 16¾ in. The carrying weight of this model is only 31½ lb.

Improved Catenary Clip

GREATER clamping power with freedom from obstruction to current collectors are features of the new duplex hollow screw catenary clip manufactured by the Ohio Brass Company, Mansfield, Ohio. This device is used to suspend the trolley contact wire from the secondary messenger wire on compound catenary systems. Screw heads do not project on either side of the clamp, affording a trim appearance, and offering no obstruction to current collectors. On sharp curves, this characteristic is of considerable value as it will clear a pantagraph or wheel at any angle.

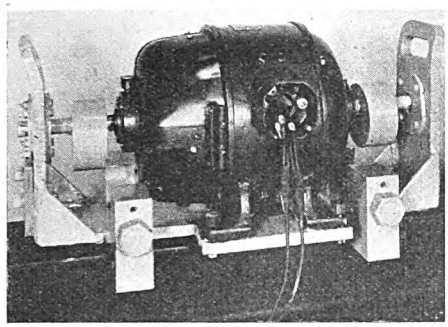


Catenary clip made by the Ohio Brass Company has countersunk screw, giving more freedom to passing collectors

Because the screw is entirely below the surface, it is possible to place it much closer to the trolley wire, thus obtaining the necessary strength with a thinner and lighter cross-section. The device is made of high-strength bronze or Flector malleable iron.

Portable Mortar Flow Pulsator

FOR use in the construction of all types of concreted track the International Steel Tie Company has brought out a new type of portable mortar flow pulsator. This consists of an electric motor, on the shaft of which are carried two eccentric flywheels. The motor is set in a U-shaped frame which is placed on the head of the rail with the armature shaft parallel to the rail. In making either limited or extensive repairs, the

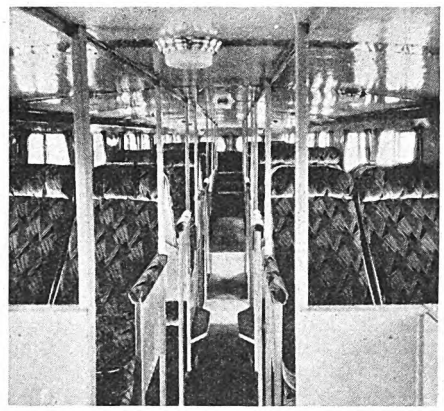


Apparatus designed by the International Steel Tie Company to vibrate concrete used in track construction has an electric motor with eccentric flywheels mounted on the armature shaft

portable pulsator can be used to vibrate a sand-cement grout of a small-aggregate concrete, filling the voids under and around the rail base.

Double Deck Observation Bus Developed by Pickwick

DIFFERING in many important respects from previous designs a new 53-passenger double-deck observation coach has been developed by the Pickwick Motor Coach Works, Los Angeles, Cal. The new vehicle,



Upper deck of Pickwick observation coach, showing reclining seats deeply upholstered and covered with velours

which has a wheelbase of 246 in., is designed for intercity service. Unloaded weight is 17,000 lb. and the loaded weight is estimated to be approximately 25,000 lb. The total length is 33 ft., width 8 ft., and height 9 ft. 10 in. Although the new vehicle has practically twice the carrying capacity of the 27-passenger Pickwick de luxe coach, the cost of operation is said to be no greater.

A baggage compartment is provided at the rear of the lower deck. Seats are of the reclining type deeply upholstered and covered with velours. A lavatory is located just behind and below the driver's compartment. As in the Pickwick "Nite Coach," a buffet can be installed in the front entrance passage so that meals can be served on portable tables if desired.

The body is of all-metal construction employing duralumin extensively. A six-cylinder Sterling "Petrol" engine, rated at 150 hp. and at 1,500 r.p.m., is used. The engine is so mounted that it can be removed easily and a complete new power plant installed in a short time.

Double-deck Pickwick observation coach seating 53 passengers and weighing 25,000 lb. loaded

Digitized by Google

NEWS *of the Industry*

LATE NEWS

San Diego, Cal.—The San Diego Electric Railway is reconstructing double track on Market Street, between Third and Fourth Streets and will follow immediately with reconstruction on University Avenue between Florida and Thirtieth Street, as the first two units of its $300,000 1930 program.

✦

Washington, D. C.—Public works and utilities construction contracts during first three months of 1930 were the largest in five years, representing combined valuation of more than $303,000,000, an increase of 56 per cent over first quarter of 1929, according to Secretary of Commerce Lamont.

✦

New York, N. Y. — The Nassau-Broad Street link of the Brooklyn-Manhattan Transit Corporation subway is now 80 per cent completed. Bids for completion of the Fulton Street and Broad Street stations will be received on May 9. The new line extends from the B.-M.T. tunnel at the Battery to a connection with the B.-M.T. system at the Municipal Building, to serve as a short-line downtown service eliminating the need of sending trains up Broadway to the Sixtieth Street tunnel to Queens.

✦

New Haven, Conn.—The Connecticut Company has petitioned the Public Utilities Commission for authority to substitute service by bus for through railway service between Hartford and Middletown and to substitute service by bus for trolley service in Middletown.

✦

Uniontown, Pa. — When the West Penn Railways completes its new $500,000 terminal and track relocation program in Uniontown during July, there will be a community celebration. Work on the new terminal has progressed rapidly.

✦

Seattle, Wash. — Ordinances appropriating $63,000 for reconstruction of Municipal Railway tracks on Pike Street and on West Spokane Street are before the City Council. The work on West Spokane Street is to be a part of the grade separation development. It is estimated to cost $42,000.

✦

New York, N. Y. — The Board of Transportation states that the Eighth Avenue subway will be open for fully 12 miles of its main length, between Broadway and 216th Street on the north and Fulton Street on the south, by the middle of July, 1931.

✦

Niagara Falls, N. Y. — The Public Service Commission has suspended the tariff filed by the International Railway proposing increased fares here to and including Aug. 14 next, unless otherwise directed by the commission. There will be a further hearing on the schedule, which proposes an 8-cent fare in place of 5 cents, with two tickets for 15 cents, at Buffalo on April 28.

(*Late News Continued on Page* 290)

New Chicago Unification Franchise Almost Ready

Financial Provisions of New Ordinance Still to Be Settled Before Measure Goes to Council. Negotiations Conducted in Liberal Spirit

AMONG the important points just settled in connection with the new coordination ordinance for Chicago was agreement on the financial return to the new company, according to the plan suggested by Attorney Fisher. The section provides a "fair and reasonable return" to the new consolidated company, but during the first three years it shall not be more than the separate companies earned last year, plus the same rate on new money invested. Any excess earnings are to be used to reduce the capitalization of the company. During the three years a minimum of $65,000,000 is to be spent on extensions and betterments.

The regulatory commission is to determine the "fair and reasonable return" after the initial three-year period, and any excess shall be turned over to the transit trustee of the city. The company will be permitted to appeal to the courts from the ruling of the commission on returns.

Present fares will continue under the new franchise. This will mean a 7-cent fare on the surface lines and a 10-cent fare on the elevated roads. Three cents will be charged for a transfer from the surface to the elevated lines, with free transfers from the "L" to the street cars. Transfers between the surface lines and the feeder buses will be free, but transfers between the buses and the elevated lines will cost 3 cents.

An unexpected provision, inserted last week, obligates the new consolidated company to remove the elevated structure in the loop, Chicago's central business district, after the subways to be built by the city have obviated need of the "L" there, and when its value has been amortized.

(*Continued on Page* 291)

COMING MEETINGS

April 29-May 1—United States Chamber of Commerce, Washington, D. C.

May 14-15—Association of Electric Railway Equipment Men, Middle Atlantic States, Scranton, Pa.

May 20-21—Public Utility Advertising Association annual convention, Washington, D. C.

June 16—National Association of Purchasing Agents, annual convention, Chicago, Ill.

June 23-26—American Electric Railway Association, 49th annual convention, San Francisco, Cal.

June 29-July 6 — International Transport Congress, Warsaw, Poland.

July 23-25 — Electric Railway Association of Equipment Men, Southern Properties, Nashville, Tenn.

Aug. 13-14—Wisconsin Utilities Association, Milwaukee, Wis.

$1,000,000 Oregon Project Approved

Authorization for the Oregon Electric Railway to construct its proposed extension in Linn County, and to operate in that county over the Southern Pacific company's line, has been given by the Interstate Commerce Commission.

The act of the commission opens the way for a $1,000,000 railroad development planned for many months. The proposed line would tap a great area of fine timber in the Santiam Valley, on the west slope of the Cascades.

Actual construction of track would start from Lebanon. The full project calls for steel clear to Cascadia, on the Santiam, a distance of 39 miles. There also would be the branch to a short distance above Holley in the Calapooia Valley, 14 miles; the Whitcomb branch of 8.5 miles and the McDowell Creek branch of 5.5 miles.

In addition, the Oregon Electric has an application pending for an extension into the upper Siuslaw Valley south and west of Eugene, in Lane County, that involves more than $1,000,000.

Speeding Up Central Territory Freight Service

Overnight freight service between Fort Wayne, Ind., and Cleveland, Ohio, has been started by the Fort Wayne-Lima Railroad and connecting electric railways. Through cars leaving Fort Wayne at 3:30 p.m. daily arrive in Cleveland early the following morning. The same fast schedule is maintained in the opposite direction. The schedule is arranged to make connections at Fort Wayne with fast freight runs to and from stations on the Indiana Service Corporation Lines, Union Traction Company of Indiana and connections beyond. Cars in this new service are operated over the Fort Wayne-Lima Railroad to Lima, Ohio; Cincinnati & Lake Erie Railroad to Toledo, and Lake Shore Electric Railway from Toledo to Cleveland.

Digitized by Google

Free Discussion of Problems of the Small-City Railway

With the view of obtaining a collective picture of the situation the committee on small-city operation of the Transportation and Traffic Association met in New York in a three-day session starting April 2. Chairman Spurr outlined a procedure, previously agreed upon, under which each member present took the witness stand and outlined the conditions on his property, subject to examination and cross-examination by the chairman, Leslie Vickers, economist, and the other members present. Any and all questions were admissible. The proceedings were confidential. More than twenty members and guests were present from properties under public ownership, under public trusteeship, as separate units, and as units of holding corporations.

Among the subjects discussed were past and present earnings, franchise obligations, taxation, paving requirements, public relations, fares, power rates, financial and corporate set-up, operating practices, and the place of the bus in the scheme of things. While the substitution of buses for trolley cars has in certain instances relieved companies from unduly burdensome paving and track rehabilitation work, the introduction of the bus has been accompanied by a variety of troubles peculiar to that vehicle. Some operators reported, however, that the public has taken more readily to an increase in fare where buses have been substituted. The weekly pass has been well received on a number of properties and has served to stimulate traffic and stabilize the passenger movement. From the standpoint of public relations, operators favor many riders at low fares to a smaller number of higher rates.

Members present expressed themselves as highly pleased with the procedure followed and with the results obtained. Hope was expressed that a similar series of conferences might be held in the future.

Company Would Reopen St. Louis Wage Agreement

The St. Louis Public Service Company has notified officers of the Amalgamated Association that the company desires to re-open the existing wage scale and working agreement which expires on May 20. The agreement provides that either side may serve notice of its intention to re-open the agreement within 30 days of any expiration date.

Stanley Clarke, president, says the railway has no desire to decrease wages, but merely wants to clarify certain provisions in the award made by the Missouri Public Service Commission several months ago when the state body arbitrated a dispute between the company and the union.

The executive board of the union on April 17 voted not to re-open the contract although not satisfied with the wages and working conditions fixed by the commission. This feeling is reflected in a letter by the union in which the company is asked to withdraw its request that the working agreement be re-opened at this time.

The union said that if the company insists on a reconsideration of the agreement, the workers will then request that other sections be re-opened. The union also states that the Public Service Commission is not acceptable as an arbitrator if the union and company are unable to settle matters by conference.

Here's Another Point of View

THE editor of the railway publication intended for distribution to the public is always preaching to us to park our machines at home and ride the street car. Why do not the officers of the railway do that and spend 8 1-3 cents and help their company? Notice the machines around the railway building and figure three passengers to a car; what a difference it would make in a month's time! No, no, the officials are too good to associate with the common public.—*From a letter to a daily newspaper editor.*

Sale of Seattle-Tacoma Road Ordered

The Puget Sound Electric Railway, once operating between Tacoma and Seattle, Wash., has been ordered sold at public auction on June 16, by Judge Cushman, of the federal district court. No minimum price has been fixed. Agreement between two litigants, the Old Colony Trust Company, plaintiffs, and the Puget Sound Power & Light Company, defendants, that the property should be sold free of encumbrances, is believed to have precipitated the order of sale. The light company agreed to cancel its long-term leases for power line rights in event a sale is negotiated. When the line went into the hands of a receiver, Judge Cushman ordered service maintained until December, 1928, when it was shown that the road could not be operated at a profit. Receivers' certificates are outstanding in the amount of $50,000.

Poster Competition Successful in Binghamton

Awards have been made in the poster competition fostered recently by the Triple Cities Traction Company, Binghamton, N. Y. There were two major awards, first and second, and eight honorable mentions. The contest provoked much comment favorable to the company. The contest was not altogether premeditated. For several years the company used a standard size advertising car card which fits into a frame placed on the signal box in front of the passenger as he is about to leave the car, a location also in plain sight of seated passengers. Previously this space was used for company notices, transfers, safety, red cross, and the like, but about three months ago the company put in a clever verse signed "From a Patron." Other patrons immediately wanted to see if they could not get into print. None, however, was willing to permit the use of his name. By February the supply had become so great that a change of copy became imperative every week. This led to the thought "Why not have a contest for the Binghamton Central High School?" Safety and service were suggested as the principal subjects, the results to be judged by three members of the "Panorama" staff —a High School magazine. Prizes were filled token carriers—twelve 7½-cent tokens —four carriers for first, two for second, and one each for honorable mention.

Adverse Economic Factors Keep Portland Receipts Down

W. H. Lines, vice-president in charge of transportation for the Pacific Northwest Public Service Company, Portland, Ore., attributes continued good weather this spring, coupled with the unemployment factor, as responsible for the lack of appreciable revenue increases from the 10-cent fare over 1929 figures, when the 8-cent fare prevailed.

Total receipts for the period, from March 6, when the new fare went into effect, to March 15, inclusive, were $126,802, as compared with $125,660 for the similar ten-day period in 1929 under the 8-cent fare, and $128,823 for the similar ten-day period in 1928.

Receipts for the period from March 16 to March 25, inclusive, were $118,265 under the 10-cent fare, as compared with $117,637 for the similar period in 1929 and $121,841 for similar period in 1928.

Receipts for the period from March 26 to April 4, inclusive, under the 10-cent fare were $124,129, as compared with $124,964 for the similar period last year and $126,473 for the similar period in 1928.

The unemployment factor, Mr. Lines asserted, had been responsible for an 11 per cent decrease in the number of passengers carried during the 8-cent fare period immediately preceding the new 10-cent fare.

Revenues for the March 6-April 4 periods listed total as follows: 1930, $369,196; 1929, $368,261; 1928, $377,137.

Columbia Case Before U.S. Supreme Court on May 2

A motion to advance the hearing of a case from the South Carolina courts dealing with the right of regulatory authorities to compel the operation of railway service at a loss was granted by the U. S. Supreme Court on April 21. The case has been assigned for argument on May 2.

The controversy involves the right of the Columbia Railway, Gas & Electric Company to abandon its railway in Columbia, S. C. Counsel for the railway contends railway service was abandoned because of losses sustained over a period of years. Notwithstanding the losses suffered, the South Carolina authorities sought to compel the continuance of operation.

Railway attorneys carried the case to the Supreme Court on an appeal from a mandamus proceeding instituted by the attorney-general of the state to compel the resumption of operations. The Supreme Court of South Carolina held that the railway service could not be separately abandoned, if the business as a whole is profitable.

The Broad River Power Company, which purchased the gas and electric properties, says the decision of the state court is contrary to the fourteenth amendment to the federal constitution, since it compels the operation of railway service at a loss. Exception also is taken by the company to the admission of evidence by the state court which purports to show that the railway, if properly managed, could be operated in the future at a profit. The company maintains there is no evidence to support this opinion as to future operations.

Digitized by Google

LATE NEWS

(*Continued from Page 288*)

Trenton, N. J.—Governor Larson will sign Senator McAllister's bill allowing the Bridgeton & Millville Traction Company to transform itself into a bus line without the consent of the municipalities, but with the approval of the Public Utilities Commission.

✦

New York, N. Y.—The Suburban Transit Engineering Board reports 23,000 more suburban passengers are being brought into Manhattan daily than on corresponding days two years ago. New Jersey contributed 318,100 commuters, Long Island 167,000 and Westchester 95,400.

✦

Trenton, N. J.—The Vollmer bill has failed to pass the Legislature. The bill was intended to repeal the 1929 act, which permitted electric railways to deduct from franchise taxes amounts equal to the fares of police and firemen carried without charge.

✦

Port Chester, N. Y. — Cornelius N. Bliss, New York, has been elected a director of the New York, Westchester & Boston Railway to replace the late Dr. A. T. Hadley, a director of the road for many years.

✦

Denver, Col.—After weeks of advertising, and the passing out of printed slips in the cars, the Denver Tramway rerouted many of its lines on April 1. In some cases only the number was changed, while in other cases both the number and routing was changed. In no case was there any real withdrawal of service. Thirty-four buses are well distributed over new or supplanted routes. Some of the rail lines heretofore always run with cars with two operators, are now on a one-man car basis. Twenty miles of rail route are supplanted with bus service.

✦

Rochester, N. Y. — Upon application of equity receivers for the New York State Railways, Federal Judge Adler has signed an order permitting the renewal of a labor contract between the receivers and the Amalgamated for one year from May 1, 1930.

✦

University City, Mo.—The City Council has voted to prohibit service cars between University City and Clayton, and between the Kingsland-Delmar terminus of the Delmar-Olive Street car line of the St. Louis Public Service Company and the University City High School at Balsom and Jackson Avenues.

✦

Kansas City, Mo. — George Morris, trainman for the Kansas City Public Service Company, has been re-elected by employees to represent them on the board of directors for another year. He is now starting on his third term. He was opposed by Ollie M. Brown of the mechanical department.

✦

Portland, Ore.—Frank H. Ransom, a local lumber man, has been selected by the management, and B. A. Green, attorney, by the union, to act with a third member as a board of arbitration to pass upon differences between the Pacific Northwest Public Service Company and its employees over wages. Other working conditions are acceptable.

✦

Detroit, Mich.—The Municipal Railway will discontinue service to Mt. Clemens on May 1, because patronage is dropping off. Withdrawal of service means giving up the right to use tracks of the Eastern Michigan Railways.

✦

Roanoke, Va.—A 3-cent transfer for those changing from the Vinton Street car to the Blue Ridge Heights bus line has been put into effect by the Roanoke Railway & Electric Company. Both the State Corporation Commission and the Vinton Town Council approved the plan.

✦

Erie, Pa.—The Erie Railways will reconstruct its tracks in Peach Street, from 26th Street south to the city limits, at a cost of $25,000.

✦

Philadelphia, Pa. — Operating of the Broad Street subway for the period from Sept. 1, 1928, to March 1, 1930, is estimated to have decreased earnings of the rest of the Philadelphia Rapid Transit Company system $702,820.

✦

Springfield, Mass.—The new de luxe service from Springfield to Worcester and Boston was started on April 18, with the Springfield Street Railway, the Worcester Consolidated Street Railway and the Boston, Worcester & New York Street Railway co-operating. A schedule of 3½ hours between Springfield and Boston is maintained with a limited number of stops. Three round trips are made daily.

✦

Philadelphia, Pa.—Subway trains were in regular operation on April 20, for the first time, to the South Street terminus of the extension just completed for the Broad Street subway, from City Hall southward. Beginning April 21 six-car trains were run on a three-minute headway at rush hours.

✦

Albany, N. Y.—Governor Roosevelt has vetoed the Thayer bill amending the public service commission law by providing that the attorney-general shall appoint a people's counsel.

Macaulay said:—

Men are never so likely to settle a question rightly as when they discuss it freely.

Go to the

49th A.E.R.A. Convention

at

SAN FRANCISCO

JUNE 23 TO 26, INCLUSIVE

and participate in discussions on vital transportation questions.

THREE SPECIAL TRAINS ARE BEING PROVIDED FOR YOUR CONVENIENCE.

Detroit, Mich.—Members of the Street Railway Commission have set May 1 as the day on which the Detroit Motor Bus Company must quit competing with the cars and coaches of the municipal railway on Jefferson Avenue. The department will assign its route on Vernor highway to the bus company.

✦

New Haven, Conn. — Edmund S. Wolfe, president of the First National Bank, Bridgeport, Conn., has been elected a director of the Connecticut Company to succeed the late Charles G. Sanford.

✦

Springfield, Ohio.—Albert S. Richey, Worcester, Mass., has been retained to study the Springfield city transportation situation and to help the city to solve the problem. From the city's recent advertisements for transportation proposals two bus offers were received. The Springfield Railway, now in receivership, has a franchise which extends to 1938. Through the Cincinnati & Lake Erie Railroad it made an offer some time ago, but the city rejected the proposal as unsatisfactory.

✦

St. Louis, Mo.—Effective on April 16 the average speed of cars on the Laclede Avenue division of the St. Louis Public Service Company was increased to 10.25 m.p.h., through the elimination of several unimportant stops.

✦

New York, N. Y.—Representatives of the Transit Commission, the Noise Abatement Commission and the press on April 24 attended a demonstration of a noise abatement device attached to turnstiles of the Interborough Rapid Transit Company at the Grand Central.

✦

St. Louis, Mo.—The War Department has approved the plans for the construction of the Illinois Terminal Railroad's new western approach to the McKinley Bridge over the Mississippi River between St. Louis, Mo., and Venice, Ill. The addition will connect with the elevated system through the northern part of St. Louis to the new subway under Twelfth Street.

✦

Buffalo, N. Y.—The International Bus Corporation has applied to the Public Service Commission for a certificate for a line from Niagara Square and Niagara Street, Buffalo, the route to be an extension of the Delaware Avenue bus line. City consent was granted on April 14. The same rate of fare and transfer privileges now prevailing on the Delaware Avenue line will apply to the proposed extension.

✦

El Paso, Tex.—The El Paso Electric Company follows the practice of varying the color schemes of its cars and buses in accordance with a popular modern trend. The object is to arouse greater interest in order to sell transportation service more effectively. "Color and contrast" says the company "are essential to the greatest degree of interest. This being true of life itself, it follows that the same rule applies to all contacts, including those made in efforts to secure business."

✦

Holyoke, Mass.—The Holyoke Street Railway will discontinue service on its Pelham line between East Street, Amherst and the terminus at West Pelham, on May 1.

Digitized by Google

Terms of Settlement of St. Louis Bus Strike

The Peoples' Motor Bus Company, St. Louis, Mo., on April 3 resumed operation of its 184 buses after twenty days of inactivity due to the strike of chauffeurs, conductors and shopmen. Statements issued immediately following the negotiations which resulted in the settlement of the strike, made the basis of an item in ELECTRIC RAILWAY JOURNAL NEWS for April 5, page 59, did not reflect accurately the true basis of that agreement. The really important feature was the agreement of the Amalgamated Association to foster ordinances for the elimination of service cars and for the authorization of a high-class dependable substitute service to be operated by the Peoples' Motor Bus Company, any improvements in wages and working conditions to depend on co-operation with the company towards this objective. On this question the company refused to modify its stand, the only compromise being on the length of the contract.

There was never any question about recognition of the union, because the bus company had been bought by the City Utilities Company for the avowed purpose of co-ordinating its service with that of the railway, and railway employees would not work in co-ordination with a non-union organization. The contract provides, however, that there shall be no discrimination between the union and non-union employees; that employees shall not be influenced to become members of the union other than by friendly solicitation; and that any employee attempting to influence any other employee for or against unionism by annoyance shall be subject to immediate dismissal.

The company agreed to reinstate all men who were out on strike, with the proviso that anyone arrested during the strike and subsequently convicted of assault should forthwith be dismissed.

The contract runs for two years and provides that wages and working conditions shall remain during that period as they were before the strike, unless:

1. (a) service car competition shall substantially cease, and (b) the company shall be authorized to operate a de luxe express service at a fare not exceeding 25 cents; or,
2. (a) service car competition shall substantially cease, and (b) the company's earnings shall be so increased thereby as to warrant an increase in wages.

In the event of either of these two conditions occurring, the union may on thirty days' notice elect to re-open the matter of wages and working conditions. If re-opened and fixed, there shall be no further re-opening until the expiration of the agreement. The wages and working conditions in existence prior to the strike, including the rates for overtime and the allowance of one day a week off without pay if and when operating conditions permit, are set out in detail as a matter of record.

Richard W. Meade, president of the bus company, issued a statement in which he said in part:

The regretable delay in settling the strike was due solely to the unwillingness of the union to adhere to the basis on which negotiations were originally opened: namely, that our existing scale and working conditions must continue until the unfair service car competition had been eliminated and the company authorized to operate a new class of service in substitution for it, thereby providing additional earnings necessary before increased wages could be paid.

We insisted upon a contract that embodied our existing wages and working conditions, so that there should be no dispute about them, and in placing these conditions on record we went out of our way to be liberal in construing practices that had been subject to some variation.

During the conferences for the settlement of the strike it was very clearly demonstrated that, beyond the natural desire of our employees to secure the exceedingly liberal wages and time allowances enjoyed by the employees of the St. Louis Public Service Company doing similar work, there was little or no discontent among our men.

The strike being settled and all differences adjusted, we now want to give the maximum of good service to the people of St. Louis and to extend our system in a new field where it can supplant the irregular and irresponsible mediums that have grown up like Topsy because provision never has been made for a real scheduled, dependable service of rapid mass transportation.

Indiana Commission Rejects Merger Proposal

Receivership for T. H. I. & E. and Indianapolis Street Railway Follows Disapproval of $70,000,000 Insull Utility Consolidation Petition

THE proposed $70,000,000 merger of the Insull-controlled Central Indiana Power Company properties with the Terre Haute, Indianapolis & Eastern Traction Company has been denied by the Public Service Commission of Indiana on the grounds that the merger was based on an unsound financial set up and that it would not serve the public interest.

Coincident with the rejection of the merger petition, insolvency suits were filed in two courts by the Westinghouse Electric & Manufacturing Company against the Terre Haute, Indianapolis & Eastern Traction Company and its subsidiary, the Indianapolis Street Railway. George C. Forrey, Jr., president of the Fletcher American Company, Indianapolis, was appointed receiver of the local railway by Judge Chamberlain of the Marion Circuit Court.

Action against the T.H.I. & E., was dismissed when the company sent a check to the Westinghouse company in settlement of the claim. A new receivership suit against the T.H.I. & E. was then filed in the Superior Court by the Consolidated Collieries Company, Indianapolis. Following the hearing on this petition, Elmer W. Stout, Indianapolis, was made receiver by Judge Milner.

The receivership suits were not unexpected in view of evidence presented during the merger hearings that the T.H.I. & E. had borrowed more than $2,000,000 in short term loans on the hope that the merger, if approved, would provide a way out of its financial straits. While The Indianapolis Street Railway was not involved in the merger proposal, its common stock is owned by the T.H.I. & E. and the improvement of the parent company would have helped the subsidiary.

The insolvency proceedings are expected to result in the reorganization of the two properties and the probable abandonment of several weak and losing divisions of the T.H.I. & E. The merger was proposed as a solution of these difficulties, but when it was denied, receivership proceedings were adopted as the only logical course of conserving assets, protecting creditors and providing an orderly procedure for reorganization.

It has been estimated that $7,000,000 of new capital will be needed to modernize the Indianapolis Street Railway, provide new cars and rebuild track.

In denying the petition the commission held the expected earnings were not sufficient to support the projected capitalization and that there was no adequate assurance of increased earnings to improve the financial situation of the consolidation.

"Anticipation of a substantial improvement in the net earnings of the consolidated properties for the future is a matter involving too much speculation and uncertainty for sound financing of utility property," the commission declared.

Plans for the merger first were announced in 1925 by Samuel Insull of Chicago and the late J. Randal Morgan of Philadelphia. A merger contract was approved in the summer of 1928, however, and the petition was filed Aug. 27 of that year. The first hearing, for organization, was held Oct. 9, 1928. Taking of testimony was begun on Dec. 2, 1929, and was adjourned on Dec. 10 until March 16. The hearings were concluded March 21. From the standpoints of time consumed in reaching a decision, mass of evidence presented and scope of properties involved, it was the largest case in the history of the Indiana commission.

Chicago Franchise

(*Continued from Page 288*)

Although reference to a merger of the surface and elevated lines with the Chicago Motor Coach Company was omitted from the franchise, the text neither permits nor prohibits this.

The powers of the transit trustee who will take over the city's $61,000,000 car fund and receive and disburse the city's compensation of 3 per cent of the gross annual receipts of the new company have been defined. The ordinance as now written provides that he shall not be empowered to buy city tax anticipation warrants. His investment of the transit fund must be in city, county, state and federal bonds or in securities acceptable at the federal reserve bank for rediscount, according to one of the conferees.

Plans for the subways have not yet been completed. Another month will be required before the drafting of the special assessment features of the subway ordinance will be finished. After this a public hearing must be held to conform to the statutes, the assessments spread and a confirmation of the plan obtained from the courts.

The work on the financial plan for the consolidation of the surface and elevated lines is yet to be finished, but Frank O. Wetmore, leader of the group of financiers, predicted that, with the ordinance out of the way, negotiations with the various bondholders' protective committees, will be resumed and the financial agreement will be reached without further delay.

Digitized by Google

Accident Figures Reported by 171 Interstate Lines

The Interstate Commerce Commission has compiled a report on accidents occurring in interstate electric railway operations during 1929 based on returns from the 171 carriers under the commission's jurisdiction. A report on casualties on interstate electric lines formerly was included in the commission's annual accident bulletins, but this was abandoned a number of years ago. The request that the electric carriers furnish such information for 1929 is the result of a demand for bringing together all information that may have any bearing on the subject of street and highway safety.

The number of car-miles traveled by interstate electric carriers last year totalled 256,849,500. Casualties per 1,000,000 car-miles averaged 1.45 persons killed and 11.95 persons injured. In a total of 2,675 train and train service accidents, 373 persons were killed and 3,070 injured. Collisions with automobiles at highway grade crossings constituted the principal cause. They numbered 617 and resulted in the death of 175 persons and the injury of 832. Collisions with persons at highway grade crossings numbered 218 and resulted in the death of 80 persons, 59 of whom were pedestrians, and the injury of 141. Collisions with automobiles not at highway grade crossings ranked third in the number of resulting fatalities. In 231 accidents of this kind, 50 people were killed and 295 persons were injured. The 225 persons killed in collisions with automobiles were the occupants of the automobiles. Collisions with persons elsewhere than at highway grade crossings numbered 97, killing 24, 22 of whom were pedestrians.

Collisions with other electric cars numbered 69, with four killed and 216 injured. Seven collisions with steam trains killed two and injured sixteen. Collisions with other vehicles numbered 15, resulting in 4 deaths and the injury of 15 persons.

Only seven passengers carried by the interstate electric railways last year were killed; five in boarding or alighting, an average of .03 per 1,000,000 car-miles. The number of passengers injured was 1,346; 702 in boarding or alighting, an average of 5.24 per 1,000,000 car-miles. Casualties among employees on duty numbered 24 killed and 425 injured. Fifty derailments resulted in the death of three persons, two of whom were employees and one the occupant of an automobile. Sudden stopping, starting or lurching resulted in the injury of 135 persons, 126 of whom were passengers, and nine trainmen.

Non-train accidents numbered 2,207, and caused the death of sixteen and the injury of 2,198 persons.

Evansville, Ind.—Fire on April 1 destroyed the substation on the Boonville, Ind., division of the Evansville, Suburban & Newburgh Railway, located 8 miles east of Evansville.

Conspectus of Indexes for April, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares* 1913 = 4.84	April, 1930 7.91	Mar., 1930 7.88	April, 1929 7.75	April, 1930 7.91	April, 1925 7.26
Electric Railway Materials* 1913 = 100	April, 1930 140.2	Mar., 1930 141.6	April, 1929 145.0	Dec., 1926 159.2	Feb., 1928 139.5
Electric Railway Wages* 1913 = 100	April, 1930 231.7	Mar., 1930 231.7	April, 1929 230.1	Feb., 1930 231.7	April, 1925 221.6
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	April, 1930 203.0	Mar., 1930 203.0	April, 1929 200.9	Nov., 1928 205.7	July, 1929 199.0
General Construction Cost Eng'g News-Record 1913 = 100	April, 1930 207.1	Mar., 1930 206.8	April, 1929 203.4	Jan., 1927 211.5	Nov., 1927 202.0
Wholesale Commodities U. S. Bur. Labor Stat. 1926 = 100	Mar., 1930 90.8	Feb., 1930 92.1	Mar., 1929 97.5	Nov., 1925 104.5	Mar., 1930 90.8
Wholesale Commodities Bradstreet 1913 = 9.21	April, 1930 11.18	Mar., 1930 11.22	April, 1929 12.87	Dec., 1925 14.41	April, 1930 11.18
Retail Food U. S. Bur. Labor Stat. 1913 = 100	Mar., 1930 150.1	Feb., 1930 153.0	Mar., 1929 153.0	Nov., 1925 167.1	Mar., 1930 150.1
Cost of Living Nat. Ind. Conf. Board 1914 = 100	Mar., 1930 157.4	Feb., 1930 158.8	Mar., 1929 159.8	Nov., 1925 171.8	Mar., 1930 157.4
Industrial Activity Elec. World, kw.-hr. used 1913-25 = 100	Mar., 1930 125.0	Feb., 1930 123.5	Mar., 1929 135.7	Feb., 1929 140.4	Aug., 1925 94.3
Bank Clearings Outside N. Y. City 1926 = 100	Mar., 1930 94.3	Feb., 1930 96.5	Mar., 1929 103.9	Oct., 1929 111.8	Nov., 1926 94.0
Business Failures Number	Mar., 1930 2093	Feb., 1930 2150	Mar., 1929 1704	July, 1929 1581	Sept., 1928 1348
Liabilities, Millions of Dollars	73.82	69.13	36.42	102.09	23.13

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Work on New Portland Ordinance to Start

An ordinance has been passed by the City Council of Portland, Ore., providing for retention of Carey & Harlan, consulting engineers, to appraise the railway property and prepare a service-at-cost franchise. The stated consideration for this work is $18,000.

The franchise is to be drawn in collaboration with the city attorney. It must be ready for submission to the voters in the general election in November. Chief among contemplated changes are that the Portland Electric Power Company be relieved of various imposts such as bridge tolls, franchise tax and possibly others.

One councilman offered as a counter proposal that the city call for bids to supply mass transportation by street car, trackless trolley or buses, or a combination of all three. Carey & Harlan will report on this proposal.

Increased Operating Allowance Before Cleveland Council

The Cleveland Railway on April 21 made public its executive officers' payroll in deference to requests by members of the City Council who are considering the increase in the company's operating allowance from 29 to 31 cents a car-mile. The president receives $42,500 a year; one vice-president $22,000; another vice-president and the assistant to the president, $17,500 each. The company's chief surgeon is paid $11,000, while salaries of $10,800 each go to superintendent of stores and materials, treasurer, superintendent of the accident department, civil engineer, superintendent of personnel, and superintendent of buildings and equipment.

The auditor and three other superintendents receive $9,600 each and three other executives $8,400 each. Salaries of fourteen others range from $6,600 to $4,200. The annual payroll of executives is $308,400.

In making public the payroll, President Alexander declared that it represented only a fraction of the cost of operating the company and that the City Council itself controls operating costs to a large degree by reason of its control of the service. He says that if the operating allowance is not increased the railway would have to cease insurance and pension payments for employees or reduce wages, or both.

Competition between the Hanna Building Company and the Midland Bank Building for the privilege of housing the offices of the Cleveland Railway continues to grow in intensity. The Hanna Building has offered the same amount of space as the Midland Bank Building offered at a reduction of $45,000 a year in the rent now paid. The Midland building is in the Van Sweringens' Terminal group.

In the midst of the councilmanic flurry the railway received word from Washington that the United States Supreme Court had refused to review its appeal from the decision of the lower courts holding that federal income taxes can be levied on the company's interest fund.

Digitized by Google

PERSONAL MENTION

Messrs. Palk, Blodgett and Dahl Made Vice-Presidents

Winnipeg Officials Advanced in Recognition of Their Long and Valuable Services, Publicly Proclaimed by President Anderson

AT THE annual meeting of shareholders of Winnipeg Electric Company, Winnipeg, Man., held on April 7, Lawrence Palk, W. E. Blodgett and C. H. Dahl were elected vice-presidents of the company. Mr. Palk is now vice-president in charge of executive matters, Mr. Blodgett is vice-president in charge of finances and accounting, and Mr. Dahl is vice-president in charge of operation. Each was formerly head of the particular department named. Mr. Blodgett was comptroller of Winnipeg Electric Company. He is also treasurer of Manitoba Power Company, Ltd., and of Northwestern Power Company, Ltd., associated companies, and Mr. Palk is also secretary of Winnipeg Electric and associated companies.

L. F. B. Palk

W. E. Blodgett

C. H. Dahl

In speaking of the new appointments, President Anderson said:

> I am glad to be able to announce that at the organization meeting of the board of directors the following executive appointments were made: W. E. Blodgett, vice-president in charge of finances and accounting; C. H. Dahl, vice-president in charge of operation; Lawrence Palk, vice-president in charge of executive matters.
>
> Mr. Blodgett has been the company's comptroller for some years. Mr. Dahl has been assistant general manager in charge of operation, and Mr. Palk has been assistant general manager in charge of executive matters, and in recognition of their long and valuable services rendered to the company their appointments with these titles were confirmed at the above-mentioned meeting.

Lawrence Frederick Betts Palk formerly was secretary and assistant general manager in charge of executive matters of Winnipeg Electric Company, Manitoba Power Company, Ltd., and Northwestern Power Company, Ltd. Mr. Palk was born in Winnipeg on Aug. 14, 1885. He commenced his career as a stenographer for the Winnipeg Electric Company in October, 1904. He was made secretary, secretary and assistant to president, assistant general manager in charge of executive matters and finally vice-president in charge of executive matters. He is also secretary of Winnipeg Electric and associated companies. He is a member of many societies in Winnipeg.

For a number of years Charles Henry Dahl has been assistant general manager in charge of operation. The Winnipeg Electric Company is the parent company of Manitoba Power Company, Ltd., and Northwestern Power Company, Ltd., which operate electric railway, light, power and gas utilities in Manitoba. Mr. Dahl was born in Appleton, Minn., on Feb. 12, 1888. He was educated at Marinette high school, Marinette, Wis., and Oshkosh Teacher's College. He is a B.A. of Wisconsin University. He went to Canada in November, 1919, and started with the Winnipeg Electric Company as statistician. In that capacity he familiarized himself with the operations of the various utilities to such an extent that he was rapidly promoted. He was president of the Winnipeg Lions Club in 1926 and 1927, and in 1929 was elected president of the Canadian Electric Railway Association.

William E. Blodgett, comptroller of Winnipeg Electric Company and treasurer of the Manitoba Power Company, Ltd., and the Northwestern Power Company, Ltd., has had long experience with public utilities. Previous to his start with the Winnipeg Electric Company in September, 1920, he was secretary-treasurer of the Utah Light & Traction Company. Mr. Blodgett is a native of Wisconsin and learned accounting in business institutions of Wisconsin and Minnesota. He was accountant for the Twin City Rapid Transit Company when he accepted a position with the Utah Light & Traction Company. He filled the positions of paymaster, statistician, chief clerk, assistant secretary and chief clerk to the general manager. In 1914 when the Utah Light & Railway Company was consolidated with the Salt Lake Light & Traction Company he continued as chief clerk to the manager of the new company, and in 1916 he was elected secretary and treasurer and was placed in charge of the accounting department. He held that position until his appointment as comptroller of the Winnipeg Electric Company.

✦

W. F. Miller Made Comptroller at Spokane

W. F. Miller, who has been auditor of the Washington Water Power Company, Spokane, Wash., for several years, has been elected comptroller. In his new position the duties of auditor will be merged with those of comptroller, calling for closer contact with the financial affairs of the company, in addition to the regular departmental accounting.

L. E. Morse, formerly secretary and assistant treasurer, has been elected secretary-treasurer.

The Washington Water Power Company controls the Spokane United Railways.

✦

R. M. Feustel Heads South Shore

Robert M. Feustel has been elected president of the Chicago, South Shore & South Bend Railroad, and Samuel Insull, Jr., has been elected chairman of the executive committee. Samuel Insull is chairman of the company, and the vice-presidents include William A. Sauer, Charles W. Chase, Morse DellPlain and Ralph H. James.

The members of the newly created executive committee are: Samuel Insull, Samuel Insull, Jr., Robert M. Feustel, Britton I. Budd, Bernard J. Fallon, Charles E. Thompson, and Hal M. Lytle.

The stockholders of the company voted at the annual meeting to increase the number of directors from nine to thirteen. Samuel Insull, Jr., Hal M. Lytle, E. Van Arsdel, and L. B. Andrus were elected new directors.

✦

Engineers Complete Boston-Worcester Rehabilitation

Cyrus B. Buchanan and Jerome Rich of the Buchanan & Lang Company, have concluded their connection with the Boston, Worcester & New York Street Railway. Mr. Buchanan went to Framingham after the receivership of the railway to take charge of its reorganization. Under his direction many changes and improvements were brought about. The entire roadbed between Boston and Worcester has been improved, obsolete equipment and property done away with, and new service started, not only on the original line but through the establishment of a bus service on the Post road from Boston to Worcester and New York. Messrs. Buchanan and Rich leave to undertake other work for the company which they represent.

Digitized by Google

N. J. Scott Heads New England Operators

In some respects N. J. Scott, the new president of the New England Street Railway Club, is a law unto himself as manager of the Connecticut Company at Hartford. True, that city is only one of the many in which the company operates, but it is one of the most important, if not really the most important. Let others contest that point.

Mr. Scott is known far and wide in his community and favorably, too. The Hartford division is largely Mr. Scott and Mr. Scott, with due respect to others, is largely the Hartford division. If by chance one address him by letter, back comes a reply on company paper, and the sole name on it is N. J. Scott, manager. That's the recognition Mr. Scott gets from his company. It is well deserved.

If Mr. Scott were politically ambitious he could probably be mayor, unless perchance to attain that office one must be a native of Hartford County. That would let Mr. Scott out. But to all intents and purposes he is a native. Hartford beckoned to Mr. Scott when he was twenty years old. He acknowledged the salute by entering the employ of the Hartford Street Railway as a conductor. That was in July, 1896. This he did after he was graduated from the Knowlton High School. He was born and educated in Canada.

A mathematician would discover that was 34 years ago, but Mr. Scott has not stopped to count the years. He has been too busy to ruminate much, too busy serving successively as carhouse foreman, dispatcher, superintendent of transportation and, lastly but not finally, as manager of the Connecticut Company, Hartford division, the successor to the Hartford Street Railway. Incidentally he has established himself firmly in the hearts of all the men and women of the division by his warm human understanding, and now his associates in the industry in New England have publicly acknowledged their appreciation of the man by electing him to the highest office within their power to bestow.

✦

H. S. Whiton in New Byllesby Post

Herbert S. Whiton has been appointed acting chief mechanical engineer of the Byllesby Engineering & Management Corporation, to succeed H. Boyd Brydon, who resigned on March 15.

Mr. Whiton received the degree of Bachelor of Science in Mechanical Engineering from Harvard University in 1901. Early in 1905, he entered the employ of Stone & Webster as chief engineer of the power station of the Ponce Railway & Light Company at Ponce, Porto Rico. At the end of about two years he was made manager of the company and in July, 1909, he was transferred to the Minneapolis General Electric Company as superintendent of power. In June, 1923, he was transferred to the Chicago office of Byllesby Engineering & Management Corporation.

✦

M. C. Burritt Named to New York Commission

Maurice C. Burritt of Hilton, Monroe County, N. Y., has been confirmed as a member of the Public Service Commission to succeed Commissioner William R. Pooley of Buffalo, whose term expired more than a year ago. Mr. Burritt is a Republican. Colonel Pooley has held over in office more than a year. This has been due to the fact that last year's Senate adjourned without confirming the Governor's appointment of Davis C. Adie, Buffalo Democrat, to the commission. Mr. Burritt was formerly the head of the extension service of Cornell University; in addition, he was vice-dean of the New York State Agricultural College, and has been the treasurer of the G. L. F. Exchange, having charge of the finances of this very large business organization. Furthermore, he has been president of the New York State Horticultural Society, and for the past year and a half has served as a member of the Governor's agricultural advisory commission.

Messrs. Hutcheson and Thornton in New Offices in Montreal

Lieut.-Col. J. E. Hutcheson

J. E. Hutcheson, vice-president of the Montreal Tramways, Montreal, Que., was named managing director, and Kenneth B. Thornton, formerly assistant general manager, made general manager at a meeting of the board of directors which followed the annual general meeting of the shareholders. Julian C. Smith, president, who has held the office of managing director has relinquished that office.

Intimation that the company was working on plans for an underground railway for Montreal, was offered by Mr. Smith during the course of his supplementary remarks. The company, he said, was very much alive to the transportation needs of the city, and had been investigating the possibilities of an underground system.

K. B. Thornton

Lieut.-Col. Hutcheson began his business career as a telegraph operator with the Grand Trunk Railway in Brockville in 1878 and six years later was appointed trainmaster, a position he held for six years, to 1890, when he became manager of the Ottawa Electric Railway. In 1912 he went to Montreal as general manager of the Montreal Tramways, and in 1924 was appointed vice-president and general manager.

Mr. Thornton was formerly general manager of the Canadian Light & Power Company; Quebec & New England Hydro-Electric Corporation, and consulting engineer to the Montreal Tramways. He was connected with the Montreal Light, Heat & Power Company from 1893 to 1904, when he joined J. G. White & Company, of New York and London. Upon severing his connection with the latter firm in 1911 he became associated with the Montreal Tramways.

Montreal Tramways is a subsidiary of Consolidated Securities, Ltd., which in turn is controlled by United Securities, Ltd., a company jointly controlled by Shawinigan Water & Power Company and Montreal Light, Heat & Power Consolidated. Incorporated in 1911, the company serves the city of Montreal and suburbs. It has a contract with the city of Montreal which runs to 1953, when the property may be purchased by the city or the contract is automatically extended for five-year periods.

✦

Officers Elected for Calumet Railways

Directors of the citizen-owned Calumet Railways, Inc., have elected Samuel Insull, Jr., Chicago, as chairman of the board and Morse DellPlain, head of the Northern Indiana Public Service Company, as president of the organization formed to rehabilitate the former Hammond, Whiting & East Chicago Railway. The other officers include:

Walter J. Riley, banker, East Chicago, vice-president; Henry P. Conkey, head of the Conkey Printing Company, Hammond, secretary; Walter E. Schrage, president of the Bank of Whiting and former Mayor of Whiting, Ind., treasurer; John C. Horn, president of the Washington Lumber Company, East Chicago, auditor; D. H. Mitchell, Hammond, comptroller and assistant treasurer, and D. O. Schrader, Hammond, assistant secretary.

✦

Charles E. Thornton, Bronxville, N. Y., has been appointed senior assistant utilities engineer of the Maryland Public Service Commission, Baltimore. He succeeds Edgar R. Shepperd, now with the Bureau of Standards.

Digitized by Google

D. E. Watson Heads City and Interurban Systems

David E. Watson, elected recently to the presidency of the Terre Haute, Indianapolis & Eastern Traction Company, has been acting president of that company and the Indianapolis Street Railway, Indianapolis, Ind., since May, 1929, when he assumed the duties of the late Robert I. Todd.

Mr. Watson became connected with the Terre Haute, Indianapolis & Eastern Traction Company in 1911 as local attorney at Martinsville, Ind. In June, 1929, he was transferred to the legal department of the company at Indianapolis, where he served as trial lawyer for more than ten years. He was appointed general attorney of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis Street Railway, and power and light company subsidiaries in 1923 and has represented these

D. E. Watson

companies in all cases before the state Public Service Commission since that time. In addition to his duties as president he will continue in charge of all general corporation work for these properties.

Mr. Watson was born in Cloverdale, Indiana. After he was graduated from the law school of DePauw University at Greencastle in 1896, he went to Martinsville and started a law practice. During the memorable presidential campaign of William Jennings Bryan in 1896, he attained considerable local repute as a public speaker. While a member of a successful law partnership in Martinsville, he was elected, several years later, to the office of public prosecutor of Morgan County.

Mr. Watson has been in charge of the legal interests of the Terre Haute, Indianapolis & Eastern Traction Company and subsidiary companies in the proposed merger of these companies with the Central Indiana Power Company operating subsidiaries, now before the Indiana Public Service Commission.

He is a member of the Marion County, Indiana and American Bar Associations and of several leading clubs in Indianapolis.

✦

Carl D. Henry, Sherman, Tex., has been appointed commercial agent for the Texas Electric Railway, with headquarters at Sherman. He succeeds Compton A. Huguely, who at his own request was made freight and passenger agent for the same line at Sherman, succeeding V. E. Jones, resigned. Mr. Henry is a former employee of the Missouri-Kansas-Texas Railroad, having been with the railroad in Sherman for several years. Later he was chief clerk to the division freight agent of the steam railroad at Waco. He resigned the latter position to accept a place with the Texas Electric Railway.

✦

A. E. Ferguson Vice-President of National Creosoting Company

Joshua S. Logan, president of the National Lumber & Creosoting Company, Texarkana, Ark.-Tex., announces the election of Albert E. Ferguson as vice-president and member of the board of directors of that company. Mr. Ferguson will maintain offices at the general offices of the company at Texarkana, Ark., and also at St. Louis, Mo. Mr. Ferguson is a graduate of Washburn College, Topeka, Kan., and holds a commission as captain of Field Artillery Reserves, United States Army. In 1920 he entered sales work as an associate of John J. O'Fallon with whom he was prominently identified for several years. Prior to his election to the position of vice-president of the National Lumber & Creosoting Company, Mr. Ferguson held the position of general sales manager of the company.

✦

William A. Prendergast, who recently resigned as chairman of the Public Service Commission of New York, has become a general partner of the banking and brokerage firm of W. C. Langley & Company, specialists in public utility securities. Mr. Prendergast has had wide business and financial experience. From 1899 to 1904 he was secretary-treasurer of the National Association of Credit Men. He is a well-known writer on business subjects.

✦

Arthur L. Rae, for the past three years assistant comptroller of the American Water Works & Electric Company, has succeeded A. A. Adams as comptroller. Mr. Rae was born in Holyoke, Mass., on March 17, 1891; graduated from Williams College in 1911 with a year of graduate work in the Harvard School of Business Administration. Mr. Rae's early experience with the American Telephone & Telegraph Company has given him a broad training in public utility work, but his later connections enabled him to obtain a more generalized knowledge of financial affairs and business administration.

✦

C. P. Couch has resigned as vice-president and general manager of Southern Ice & Utilities Company, at Dallas, Tex., to become vice-president in charge of operations of the Louisiana & Arkansas Railway at Shreveport, La. Mr. Couch formerly was vice-president and general manager of the Mississippi Power & Light Company, at Jackson. While in this position he developed an interconnected system supplying electric power to more than 100 cities and towns of Mississippi hitherto dependent upon isolated plants of small capacity, including many municipally-owned and operated light plants purchased by the Mississippi Power & Light Company. In association with his brother, H. C. Couch, he had a large part in developing the interconnected power systems of the present Louisiana, Arkansas & Mississippi Power & Light Companies.

"Neb" Grover Succeeds the Late C. A. Kincade

"Neb" Grover has been appointed to succeed the late C. A. Kincade as superintendent of electrical distribution of the Kansas City Public Service Company, Kansas City, Mo. Mr. Grover became connected with the Kansas City organization in 1916. This was immediately after he had finished high school, so the whole of his business life has been devoted to the Kansas City Public Service Company. First, he served in the capacity of a lineman, then as substation operator, a wireman, a light and telephone repairman, and electric switch inspector, and, in fact, nearly every job in the department. In 1918, he became assistant to Mr. Kincade, serving for a time as general foreman of all maintenance work in the department and later became supervisor of overhead line.

His actual experience in nearly every job in the department has fitted him especially for his new position as de-

"Neb" Grover

partment head. He first came officially before the public in a 1916 issue of the *Railwayan,* company house organ, in a poem entitled, "When the Smokestack Smokes at 8th and Woodland."

"Neb's" father, Charles Grover, occupied a similar position 30 years ago. Under his father's direction, the change was made from cable to trolley lines and much of the overhead and underground system was built. Another coincidence is that Charlie Grover, Jr., at present occupies a position similar to "Neb" with the Kansas City Power & Light Company.

✦

J. R. Lotz, Stone & Webster Construction Manager

J. R. Lotz has been appointed senior construction manager of the Stone & Webster Engineering Corporation. Mr. Lotz was educated at the University of Illinois and, after six years in railroad work on the Lackawanna and the Chicago & Joliet systems, joined the Stone & Webster organization in Seattle building construction activities. In 1912 he was transferred to Boston as assistant construction manager and had charge of construction on many large industrial plant projects and educational buildings. In 1919 he was appointed a construction manager and in 1928 became a vice-president of the Stone & Webster Engineering Corporation.

Digitized by Google

A. H. Wood Takes Up Commercial Department Duties

A. H. Wood, appointed to succeed "Bert" Sanders in charge of the commercial department of the Kansas City Public Service Company, Kansas City, Mo., has entered upon his new duties with all the enthusiasm characteristic of the man. True, Mr. Wood is very young, but no man undergoes the strenuous course of training which he completed so successfully as a cadet engineer in utility work unless he is a born "doer," or the seeds of the "doer" are firmly planted in him.

That he happens to be the son of an illustrious father has in no way militated against Mr. Wood. He would have to go far to outstrip his father, but certainly young Wood is headed in the right direction. His work with the Public Service Corporation of New Jersey and with Barron Collier, Inc., New York, was exacting, but it has taught him how to walk among kings and not lose his head.

Mr. Wood knows. He put in time on

A. H. Wood

the front end of a trolley car, behind the wheel of a bus, in the receiver's cage, on the line gang truck, at tamping ties, road checking, inspection work, overhauling motors in the pits, in the supervisor's office and in the traffic and time-tables departments on the New Jersey system.

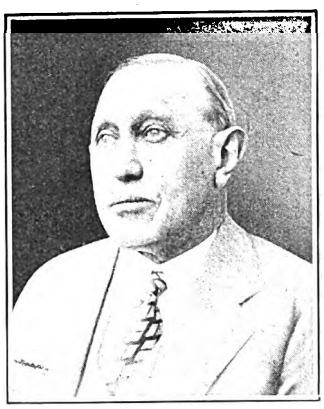
To him the many little duties handled in the commercial department at Kansas City are more of a hobby than a job. He gets real pleasure out of this work, but of all he expects most to enjoy the editing and publishing of the *Railwayan*, official publication of the company at Kansas City. He is at all times a close observer, and incognito he has been riding the Kansas City railway and bus lines familiarizing himself at first hand with the service, the public's need and the reactions of the riders. He has been more than favorably impressed, and he has not failed publicly to acknowledge his enthusiasm to the personnel.

✦

North Shore Has New Assistant General Manager

Samuel A. Morrison has assumed his duties as assistant general manager of the Chicago, North Shore & Milwaukee Railroad, with offices at Highwood, Ill. At the time of his appointment to this new post, Mr. Morrison was serving as assistant general superintendent of the South Shore Line.

Mr. Morrison brings to the "Road of Service," as the high-speed interurban



S. A. Morrison

line between Chicago and Milwaukee is known, a wealth of railroad experience, having devoted his entire life to the transportation industry. He started his career as an operator on the Chicago & North Western Railroad in 1899, working his way up through various stages of promotion until he was made a division superintendent in 1918. During the eight years he served in this capacity he worked on seven different divisions of this railroad.

Joining the Chicago, South Shore & South Bend interurban line in October, 1927, Mr. Morrison served as superintendent of freight service for one year, his ability winning him promotion to the post which he was holding at the time of his joining the North Shore Line.

✦

A. A. Adams, comptroller of the American Water Works & Electric Company, Inc., since 1920, has retired from active business. Mr. Adams has been in the employ of the company for 28 years. He was born in Pittsburgh on Sept. 2, 1884, and received his schooling and early business education there. In 1914, when the home office of the American moved to New York, Mr. Adams went there, but now will return to the city of his birth.

✦

Vine W. Burley, general manager of the Triple Cities Traction Company, Binghamton, N. Y., and former commissioner of public works there, has been named by Mayor Norman A. Boyd as a member of the board of managers of the Binghamton City Hospital, to fill the vacancy caused by the expiration of the term of Mrs. Renna Z. Spaulding. Large construction projects are ahead for the hospital and the Mayor said in appointing Mr. Burley he felt it highly desirable to place on the board one, who by reason of previous experience and judgment in construction, would not only be able to offer advice to the other members but who would be capable of valuable assistance of a supervisory character.

✦

J. A. Horner has been made assistant comptroller of the British Columbia Electric Railway, at Vancouver, B. C. Mr. Horner has been in the service of the company since 1908. From that time until 1918, he was employed as a clerk in the comptroller's department. On Feb. 1, 1918, he was promoted to accountant in this department, and now becomes assistant comptroller of this vast system.

Dr. Otto Gressens With Chicago "L" and Interurban

Dr. Otto Gressens has assumed his duties as assistant to Britton I. Budd, president of the Chicago Rapid Transit Company, operating the elevated lines in Chicago, and the Chicago, North Shore & Milwaukee Railroad, operating between Chicago and Milwaukee, a position to which he was appointed on March 5.

Previous to joining these two companies, Dr. Gressens was assistant to the president of the Public Service Company of Northern Illinois, operating a vast network of power lines serving the Chicago suburban district for light and power, and this position he still holds in addition to his new duties. He entered the employ of the Public Service Company in September, 1927, being assigned to the office of George R. Jones, vice-president. On Sept. 26, 1929, Dr. Gressens was transferred to Mr. Budd's office and appointed assistant to the president.

Dr. Otto Gressens

Before becoming affiliated with the Public Service Company, Dr. Gressens was chief statistician with the bureau of business research of the University of Illinois. Dr. Gressens was born in Sterling, Ill., and was graduated from the University of Illinois with the class of 1921.

✦

His Former Associates Honor "Bert" Sanders

Before he left Kansas City, Mo., to take up his new work as head of the branch office of the Barrows Advertising Agency at Cleveland, Ohio, E. B. (Bert) Sanders was royally fêted and banqueted at the Kansas City Athletic Club by officers of the Kansas City Public Service Company and other friends, and was presented with a handsome traveling bag as a token of friendship and esteem.

There is more to the story about Bert Sanders than was contained in the brief item about him in ELECTRIC RAILWAY JOURNAL for April. "Bert" went to the Kansas City Public Service Company just ten years ago, in 1920, to take over the publicity and advertising work as manager of the commercial department. Prior to that, he was associated with the Wichita Beacon of Wichita, Kan. as sports editor. This is the paper which became so well known under the direction of Henry Allen.

Not only did "Bert" excel in advertis-

Digitized by Google

ing and journalistic work, but broadened his training through the study of law. He attended and graduated from the Kansas City School of Law. In 1920 he passed the bar examination and became a full-fledged attorney. He was born in Washington, D. C., went out to Amarillo, Texas, spent some time in Colorado, Kansas and Missouri, and now has gone back east to Ohio.

In line with his work in the commercial department at Kansas City, "Bert" probably knew and was known by more employees and townspeople than most any other member of the company. By his work in all its various branches at Kansas City "Bert" Sanders made a national name for himself in public relations and publicity work among the utilities.

OBITUARY

Nicholas F. Brady

Nicholas F. Brady, chairman of the board of the New York Edison Company and director of half a hundred corporations, died on March 27. He had been ill since last September of arthritis. He was 51 years old.

A modest man, Mr. Brady kept himself in the background whenever possible. Nevertheless he was a man of strong convictions and striking initiative and courage. He was thoroughly trained from early manhood in large affairs, and was clear-visioned and straight-thinking. He was intensely loyal to his friends and business associates, and was generally respected, admired and loved.

N. F. Brady

The humanitarism of the man was best reflected by his work with the National Civic Federation and in connection with the so-called Brady awards, a great stimulant to careful operation in the electric railway industry. These awards were established in 1914 by the family of the late Anthony N. Brady, but were revived in 1927 largely through the good offices of Nicholas Brady himself after having been allowed to lapse during the war-time period.

Nicholas Frederic Brady was a son of the traction and public utilties magnate, Anthony N. Brady, who died some fifteen years ago leaving an enormous fortune. He was a brother of James Cox Brady, who died suddenly a year ago. Nicholas Brady was born at Albany, N. Y. He received a preliminary education in Albany and attended the Albany Academy until 1895. He then entered Yale and was graduated with the class of 1899. He began his business training immediately after he left the university and within a few years occupied an important place in the councils of the New York Edison Company, becoming its vice-president, and then, on the retirement in 1913 of Anthony N. Brady, its president.

Mr. Brady was chairman of the board of the New York Edison Company and dominated also the Consolidated Gas Company and various other important enterprises including the Brooklyn Rapid Transit Company, the United Electric Light & Power Company, the Brooklyn Edison Company, the Consolidated Telegraphical & Electrical Subway Company, the United States Cast Iron Pipe & Foundry Company and the Yonkers Electric Light Company.

✦

Dr. Thomas Addison

Dr. Thomas Addison, who served for 31 years as Pacific Coast manager of the General Electric Company, with headquarters in San Francisco, until his retirement in 1923, died suddenly in Berkeley, Cal., on April 8, at the age of 76. Educated originally as a physician, Dr. Addison was graduated from Bellevue Medical College, New York, in 1877, but after eight years gave up his practice to enter the employ of the United States Electric Company of Chicago. In 1888 he became an apparatus salesman for the Thomson-Houston Company in Chicago, and when in 1890 the Western branch of the company was reorganized, he was sent to San Francisco as local manager. Two years later he became Pacific Coast manager of the General Electric Company. When Dr. Addison went to the Pacific Coast the first electric railway of California was under construction at San Jose, and he had charge of the installation of the Thomson-Houston equipment.

After 33 years of distinguished service, Dr. Addison retired on Sept. 1, 1923. So intimately had he been connected with the electrical development of the Pacific Coast that his name will stand close to the top of the list of those pioneers whose efforts laid the foundation of the electrical industry.

✦

J. F. Sullivan

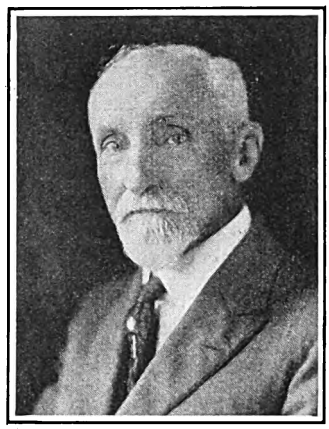
James F. Sullivan, industrial leader, financier and art patron of Philadelphia, is dead. Born in County Cork, Ireland, eighty-four years ago, Mr. Sullivan came to the United States with his brother, the late Jeremiah Sullivan, at the age of 14 years. For forty years they were associated in a wholesale dry goods business before entering the local railway field by becoming stockholders in the Frankford & Sothwark Passenger Railway. James Sullivan became a vice-president of the Market Street National Bank in 1899 and its president in 1910. During the war he devoted much of his energy in developing the armor plate and projectile business of the Midvale Steel Company. For many years he had been a director of two of the companies included in the system of the Philadelphia Rapid Transit Company.

✦

R. J. Davidson

Robert J. Davidson, one of the founders of the American Brake Shoe & Foundry Company and of the Ramapo Iron Works, predecessor to the Ramapo Ajax Corporation, died at Daytona Beach, Fla., on April 3.

Mr. Davidson was born in the town of Blooming Grove, Orange County, N. Y., on June 18, 1850. Living near Craigville, he attended the public school of that place until about fourteen years of age, when he took the position of clerk in the village store. There he remained three years, and then went to Ramapo in the same line of business. In 1872 he accepted a position with the Ramapo Wheel & Foundry Company of Ramapo, N. Y., as shipping clerk. He held this position only a short time, when he was advanced to bookkeeper and later became correspondence clerk.



R. J. Davidson

In 1881 the Ramapo Iron Works Company elected him to the office of secretary. He, however, continued to fill his position with the Ramapo Wheel & Foundry Company until 1883, when he resigned that position and took an active part in the control and management of the Ramapo Iron Works, as secretary of the company.

He was instrumental with others in organizing the Ramapo Foundry Company, and when the latter was merged with the American Brake Shoe & Foundry Company he became a director, a member of the executive committee and chairman of the finance committee, which position he held until his death.

His main activities, however, were in connection with the Ramapo Iron Works, later the Ramapo Ajax Corporation. He was treasurer of this company at the time of his death and for 47 years he has been active in its management. He was equally interested in the village of Hillburn and was a leader in all church, school and community activities.

✦

J. B. Sheridan

John B. Sheridan, former director of the Missouri Committee on Public Utility Information, died at St. Louis, Mo., on March 15, following a nervous breakdown. Mr. Sheridan terminated his active connection with the committee

Digitized by Google

in 1928, shortly after he attracted nation-wide attention through testimony given before the Federal Trade Commission at Washington concerning the activities of his organization.

Prior to entering the public utility publicity field, Mr. Sheridan had worked on newspapers in St. Louis for 30 years. He was one of the first journalists to add life and color to the account of a baseball game. To his credit were many classic efforts in dramatic and musical criticism and in covering other assignments. He was the author of several books on sporting subjects. Mr. Sheridan was a native of Ireland.

✦

William A. Moberly, an employee for about thirty years of the Kansas City Public Service Company, Kansas City, Mo., died on March 13. Mr. Moberly entered the service of the railway in Kansas City in April, 1889, and was retired on a pension July, 1927, having been in the company's service continuously during that period. He started out as a cable splicer for the old Grand Avenue Cable Line. Thereafter he held various positions as driver, motorman, assistant superintendent and superintendent of various divisions of the company before entering the general office. He was in charge of the schedule department there, his office being a clearing house of railway information.

✦

John J. Borger, superintendent of electrical distribution for the Springfield Gas & Electric Company, Springfield, Mo., which controls the Springfield Traction Company, died on April 9. He was untiring in his devotion to the work assigned him, and did much work of an experimental nature outside the line of his regular duty. He was particularly active in his study of the problem of the effect of railway surges on radio reception.

✦

William F. Needles, former division superintendent of the Cincinnati Street Railway, Cincinnati, Ohio, is dead. He had retired from active service on account of illness. Mr. Needles began as a conductor in 1878, joined the Mount Lookout dummy line two years later and became an engineer on that crude old steam engine that towed two uncomfortable passenger cars, or at times freight cars, up what is now Delta Avenue. In 1898 he became a motorman on the East End line. From 1899 to 1903 he worked as carhouse foreman. On April 1, 1903, he returned to the transportation department as an inspector. On Oct. 1, 1905, he was promoted to the superintendency of the Avondale division, which position he held up to the time of his retirement.

✦

Fred M. Locke, inventor of the porcelain insulator and oven glass, is dead. He was 69 years old. Mr. Locke retired from business in 1904, devoting all his time to laboratory work and leaving the management of the Victor plant to a son, Fred J. Locke, who died on March 7.

✦

Charles William Woeber, of the Woeber Carriage Company, Denver, Col., died on March 16, aged 73. For a number of years the Woeber company manufactured and sold street railway cars all over the United States, but supplying principally companies in the West, particularly in Denver.

INDUSTRY MARKET AND TRADE NEWS

New Car Orders Show Encouraging Trend

Orders actually placed for city and interurban cars since the first of the year added to orders now pending total approximately 460 units, and substantiate early estimates to the effect that 1930 would see an encouraging revival in new purchases. Some fourteen properties have either placed orders or called for bids, in addition to which, two electrified steam railways have signed contracts for the construction of a total of 78 cars for extensions to their services. Thus in four months, in spite of a nation-wide business depression, the electric railways have indicated their intention of purchasing nearly one half as many cars as were ordered during the entire year of 1929.

Conspicuous among the orders of cars for city service is that of the United Railways & Electric Company, of Baltimore, for 150 units, the particulars of which are described elsewhere in this issue. Pending orders in large volume include that of the Detroit Department of Street Railways for 130 cars for city service. The North Shore Line is receiving 25 cars for high speed interurban service, while its companion line, the South Shore route, is soon to place orders for 20 additional units. The Youngstown Municipal Railway has received 13 cars of an advanced type for service on its city lines, and the Northern Indiana Railways, of South Bend, is having ten attractive interurban cars built.

Cincinnati & Lake Erie Railroad Receives New Freight Cars

Fifteen double-end, all steel motor freight cars were recently delivered to the Cincinnati & Lake Erie Railroad, Dayton, Ohio, by the Cincinnati Car Corporation. The car bodies are 50 ft. long, 8 ft. 10 in. wide, and 13 ft. 3 in. from rail to top of trolley board. They have a capacity of 80,000 lb. of freight, and the weight, including equipment, is given at approximately the same figure.

While the bodies are new, the motors (of which there are four of the Westinghouse 303-A type), the control, and the MCB trucks with 37 in. wheels were taken from heavy interurban passenger cars which have been retired from service, soon to be replaced by lighter cars. Double-end Westinghouse H.L. control and Westinghouse Traction Brake Company's air brake equipment is provided.

The freight motors are designed to make schedule speeds up to 30 miles per hour, pulling trains of from five to fifteen box cars. They will operate over the system, which extends from Cincinnati to Toledo, and will also be available for interchange service.

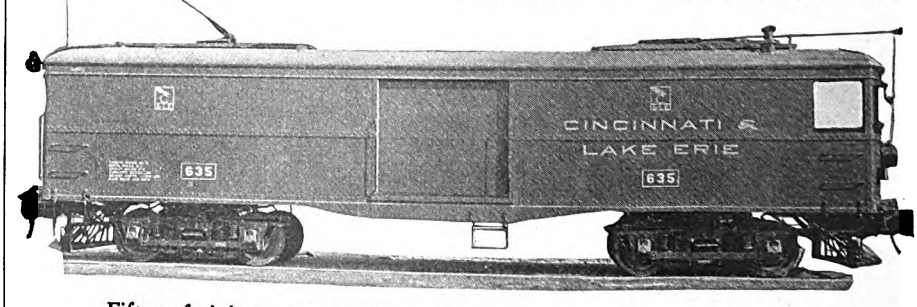
Ten New Cars for South Bend

Northern Indiana Railway, Inc., of South Bend, Ind., has placed an order with the Cincinnati Car Corporation for ten double-end, double-truck street cars for city service. Delivery is to be made about May 1.

The new cars, which are designed to seat 44 passengers, will have a length over the body posts of 41 ft. 6 in., and an over all width of 8 ft. 6 in. Bodies are to be of steel and wood, with walnut-interior finish. They will be provided with Westinghouse air brakes, Westinghouse K-75-E control, and with four 35 hp. Westinghouse motors, mounted on trucks supplied by the Cincinnati Car Corporation. Davis steel wheels, 26 in. in diameter, are supplied.

Other detailed specifications of the new cars are as follows:

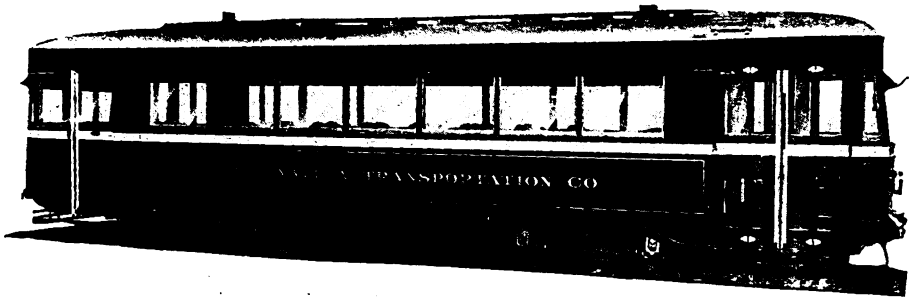
Air brakes	Westinghouse
Axles	Cincinnati standard
Buffers	Corrugated face for use as anti climbers
Buzzer	Faraday high voltage
Car trimming	Bronze, light RR finish
Conduits	Duratube
Couplers	Standard
Destination signs (front and side)	Hunter
Door operating mechanism	National Pneumatic Company front door; treadle exit at rear
Fare boxes	Johnson
Fenders and wheel guard	Standard
Gears and pinions	Nuttall
Hand brakes	Drop type
Heaters	Consolidated, Thermostat control
Headlights	Ohio Brass WP—No. 29416
Journal boxes	Cincinnati standard
Lightning arresters	Westinghouse K-3
Lighting fixtures	Dayton
Paint	Outside, enamel, inside, varnish and stain
Sanders	Ohio Brass Co.
Sash and fixtures	Adams and Westlake
Seats	Hale & Kilburn—392
Seating material	Cleveland Tanning Company genuine leather
Slack adjusters	Brill
Springs	Combination coil and semi-elliptic
Step treads	Oskelite
Trolley catcher	Ohio Brass
Trolley base	Ohio Brass, lightweight
Ventilators	Nichols-Lintern



Fifteen freight motors of this type have been placed in service by the Cincinnati & Lake Erie Railroad

Digitized by Google

New Cars for Yakima Valley Company



A green color scheme contributes to the attractive appearance of new cars for a western property

Three double-end double-truck cars of the Master Unit type have been delivered to the Yakima Valley Transportation Company, Yakima, Wash., by the American Car Company division of the J. G. Brill Company.

Designed for one-man operation in city service, the cars have seats for 40 passengers and weigh, complete, 36,900 lb. Over-all length is 40 ft. 10 in., with a length over the body posts of 27 ft. 5 in. Over-all width is 8 ft. 5½ in., and height from rail to trolley base is 10 ft. 5 in. Bodies are of all steel construction, and the roof is of the arch type. Trucks are of the Brill No. 177-E-1-X type, with wheelbase of 5 ft. 4 in., and are provided with cast iron wheels, 26 in. in diameter, supplied by the American Car & Foundry Company.

Other features of the new cars are as follows:

Air brakes	Westinghouse Traction Brake Company
Armature bearings	Ball type
Axles	Hammered steel
Car signal system	Consolidated Car Heating Company
Compressors	General Electric Company's C.P.-28
Conduit	Flexible
Control	Westinghouse K-75
Curtain fixtures	Rex, all-metal
Curtain material	Pantasote No. 84/84
Destination signs	Hunter
Door Mechanism	National Pneumatic Company
Doors	Folding
Finish	"Old Dutch" enamel
Floor covering	Flexolith
Gears and pinions	Helical
Glass	Libby-Owens plate
Hand brakes	Brill Vertical
Heaters	Consolidated Car Heating Company
Headlights	Crouse-Hinds
Headlining	¼ in. Agasote
Interior trim	Mahogany
Journal bearings	Plain
Journal boxes	Brill
Lamp fixtures	Electric Service Supply Company No. 27901
Motors	Westinghouse No. 510-E, inside hung
Roof material	Wood, canvas covered
Safety car devices	Westinghouse Air Brake Company
Sash fixtures	Dayton
Seats	Brill No. 201-D
Seat spacing	3 ft. 5 in.
Seating material	Leather
Slack adjusters	Brill "Mechanical"
Steps	Stationary
Step treads	Kass
Trolley retrievers	Ohio Brass Company No. 13120
Trolley base	U.S. No. 13
Trolley wheels	U.S.
Ventilators	Brill "Exhaust"
Wheelguards	Hudson Bowring trays

C. H. Jensen has joined the engineering staff of the Copperweld Steel Company, Glassport, Pa. He was formerly with the Pittsburgh branch of the Byllesby Engineering & Management Corporation. Mr. Jensen was graduated from Washington State College in 1917. After leaving college, he was employed by the Westinghouse company as a graduate student, later entering the supply engineering and transformer engineering departments. In 1924, he entered the distribution engineering department of the West Penn Power Company in Pittsburgh, and in 1926 transferred to the Duquesne Light Company. When the Pittsburgh branch of the Byllesby Engineering & Management Corporation was formed in 1927, Mr. Jensen was transferred to that organization, and has since been associated with it.

Wide aisles, spacious plate glass windows, comfortable seats and well-diffused lighting are features of new cars for the Yakima Valley Transportation Company

Speer Carbon Company Enters Railway Field

The Speer Carbon Company of St. Marys, Pa., has recently announced a new and complete line of railway brushes. This company is one of the oldest carbon manufacturers in the United States, having been organized in 1899. The new Speer line of brushes includes grades suitable for all types of railway motors, whether of the ventilated or enclosed types, and for operation on all voltages of alternating or direct current.

South Shore Line to Have New Shop

The Chicago South Shore & South Bend Railroad has started work on a new shop building to be erected at a total cost of $235,000 at Michigan City, Ind. Grading operations are now well under way and are expected to be finished in a month. Actual construction will be started in May, and the building is expected to be completed by August 1. It will be constructed of steel, concrete, brick and glass and will be fireproof throughout. The walls will be largely of glass and the roof will be saw-toothed with windows facing north to provide daylight inside. The new shop will have two traveling cranes, of 5- and 10-ton capacity. Cars will be taken in and out of the shop over a transfer table.

The contract for the construction of the building has been let to P. H. Lorenz. Arthur U. Gerber, of Chicago, is the architect.

Bus Deliveries Continue at Steady Rate

Greater stability in the use of buses as a means of transportation in local districts and for intercity service is indicated by the absence of new names among recent purchasers listed below. Deliveries reported during March and April, both for replacements and for extensions of present services, appear to be confined almost entirely to operations established several years.

Twin Coach deliveries include ten units of the urban type, including one gas-electric, to the Youngstown Municipal Railway, which already had ten buses of this general type in service. The Boston Elevated Railway and the Portland Electric Power Company, of Portland, Ore., each added one urban type Twin Coach to its present bus fleet, while the Milwaukee Electric Railway & Light Company added three Twin Coaches of the parlor car type, equipped with reclining chairs. The San Diego Electric Railway has placed orders for three 40-passenger buses to supplement its present fleet and take care of increasing travel on its established routes. Two of the buses will be supplied by the Twin Coach Corporation, and one by the American Car & Foundry Motors Company.

Tri-City Railway, of Davenport, Iowa, has received one Mack Model AB 29-passenger city type bus, and the Iowa Southern Utilities, of Centerville, has accepted delivery of seven Model AB 25-passenger city type buses from the same manufacturer. The Connecticut Company and the Denver Tramway Corporation have also increased their equipment by the addition of five and two Mack Model BC 29-passenger buses respectively.

General Motors Truck Company reports deliveries to electric railway properties of its Type U city service units as follows: Five to the Ft. Madison Street Railway; two to Oklahoma Railway; five to Pittsburgh Motor Coach Company; and one to the Beaver Valley Motor Coach Company, of New Brighton, Pa. Six Type Y coaches for intercity service were delivered to the Dayton & Columbus Transportation Company, of Springfield, Ohio, and the Potomac Edison Company, of Cumberland, Md., accepted three additional Type W buses for city service. Canadian deliveries include twelve Type W city service coaches to the London Street Railway Company, and a Type Z coach to the Toronto Transportation Commission.

A.C.F. deliveries during the month include ten 40-passenger coaches of the metropolitan type to the Boston Elevated Railway, and eleven chassis to the North Coast Transportation Company, of Everett, Wash. Of this last order three have a 264-in. wheelbase and eight a 240-in. wheelbase. The chassis will be mounted with bodies of the Newell type and will be used in intercity service.

Conspicuous among recent White de-

Digitized by Google

liveries are to be noted four Model 53 buses to the Cia. Forca Nordeste de Brazil, and nine buses of similar model to the Pernambuco Tramways & Power Company. White has also recently delivered four Model 65A buses to Montreal Tramways, three Model 54 buses to Los Angeles Railway, three Model 50B buses to the Middlesex & Boston Street Railway, and one Model 54 bus to the Lewistown Transportation Company of Lewistown, Pa. Fourteen White buses ordered early in the year have been delivered to Public Service Co-ordinated Transport, of Newark, N. J.

General Motors and Leyland Buses for Toronto

Engines of 150 hp. are to be installed in ten of the twenty new buses which are now being built for the Toronto Transportation Commission, Toronto, Ont. The highest horsepower hitherto in use in the city fleet has been 110. The engines are part of the new chassis being secured from General Motors. The other ten chassis, imported from the Leyland works in England, will have 100-hp. engines.

The bodies for the new buses are being built at the Hillcrest shops as a measure of unemployment relief. The new vehicles will be used on existing city routes.

The bodies for the General Motors chassis will seat 29 passengers, but will have no treadle door. Those for the Leyland chassis will seat 27 and will be equipped with the treadle.

Okonite Company; Okonite, Callender Cable Company, Inc., and the **Hazard Insulated Wire Works Division of the Okonite Company,** announce that they will presently move their Chicago offices to suite 2828 of the 20 North Wacker Drive Building in that city.

Price of Copper Reduced to 14 Cents Per Pound

Just a year to a day after the price was pegged at 18 cents, Connecticut delivery, the price of copper was cut to 14 cents a pound, this constituting one of the most abrupt declines in commodity prices that has been recorded in recent years. In well-informed quarters the reduction was not unexpected, as it had been known for some weeks that small producers had been shading the price to certain customers.

The quotation of 18 cents a pound, established on April 15, 1929, followed a swift advance that had carried the price of the red metal to a maximum of 24 cents, which was attained during March of last year. This peak followed a heavy wave of buying, but it is believed that comparatively little copper changed hands at the high levels. Cautious buying, following the reduction to 18 cents, continued until it assumed the proportions of a buyers strike. This, however, was of short duration, and gave way to well-sustained purchases that continued until the collapse of the stock market and the resultant slump in business.

General Cable Reorganizes District Sales Offices

A new field sales policy has been made effective by General Cable Corporation, by the establishment of eighteen district and territorial sales offices, and the assignment of the entire district sales personnel of Dudlo, Rome, Safety and Standard Underground Divisions to these new territories.

Until this change, the sales organizations of the four Divisions had functioned in parallel, maintaining the industry contacts which each had established over many years of service. This reorganization of sales forces further consolidates these facilities and makes them more readily available.

The identities of the thirteen companies comprising the four operating divisions will be continued as manufacturing and shipping units, and all present trademarks will be continued. Resident engineers will be located in the district and territorial sales offices, where they will represent locally the headquarters consulting engineering staff.

TRADE NOTES

Edwin N. Hazlett has recently joined the sales engineering department of the Copperweld Steel Company, Glassport, Pa. Mr. Hazlett was graduated from the University of Pittsburgh in 1928, and then completed the apprentice engineering course with the Duquesne Light Company. He has been connected with the distribution department of the Duquesne Light Company at McKeesPort, Pa., on transmission work.

✦

DeVilbiss Company, Toledo, Ohio, announces that the expansion of its overseas business has called president Allen Gutchess and Export Manager Rex Wells to Europe, where they will be engaged for several weeks working with the executives in charge of the London and Paris factories and sales offices of the company. Increasing industrial activity in Europe is reflected in greater demands upon the DeVilbiss organization serving overseas markets.

✦

Consolidated Car-Heating Company, Inc., Albany, N. Y., announces its new Chicago address as the Buckingham Building, 59 East Van Buren Street.

✦

American Steel Foundries announces appointment of F. A. Lorenz, Jr., as general manager of the Indiana Harbor and Pittsburgh works, in charge of sales and production. Mr. Lorenz has held the position of manager of sales for Davis Wheels; assistant to the fourth vice-president; works manager at Indiana Harbor, and now leaves the position of assistant vice-president in charge of operations.

✦

Roller-Smith Company, 233 Broadway, New York, announces the appointment of Henry N. Muller Company, First National Bank Building, Pittsburgh, Pa., as its district sales agent in western Pennsylvania, eastern Ohio and West Virginia.

✦

Continental Brake Shoe & Equipment Company, New York, has opened a Cleveland office in the Terminal Tower, in charge of Paul Zens, who has been elected a director and vice-president of the company.

✦

George H. Palm, for the past six years engineer with the new development division of the Yellow Coach & Manufacturing Company, Pontiac, Mich., a division of General Motors, has become connected, as engineer in charge of radiator construction and equipment, with the Young Radiator Company, manufacturers of truck, bus, power unit and engine cooling radiators, as well as heating units, located at Racine, Wis.

✦

Twin Coach Corporation announces the removal of its New York offices to the new Chrysler Building, 405 Lexington Avenue, corner 42nd Street.

Electric Railway Material Prices—May 1, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	14.00
Lead, cents per lb.	5.50
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	5.15
Tin, Straits, cents per lb.	36.75
Aluminum, 98 to 99 per cent, cents per lb.	24.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	41.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.35
Somerset mine run, f.o.b. mines, net ton	2.00
Pittsburgh mine run, Pittsburgh, net ton	1.40
Franklin, Ill., screenings, f.o.b. mines	1.70
Central, Ill., screenings, f.o.b. mines	1.45
Kansas screenings, Kansas City	1.85

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ⅞ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.08
Angles bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.85
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.40

Hardware—Pittsburgh

Wire nails, base per keg	$2.30
Sheet iron (24 gage), cents per lb.	2.60
Sheet iron, galvanized (24 gage), cents per lb.	3.30
Galvanized barbed wire, cents per lb.	2.95
Galvanized wire, ordinary, cents per lb.	2.90

Waste—New York

Waste, wool, cents per lb.	10.00 to 15.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	9.00 to 12.00
Colored	6.00 to 10.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	14.6
White lead in oil (100 lb. keg), cents per lb.	14.25
Turpentine (bbl. lots), per gal.	0.59
Putty, 100 lb. tins, cents per lb.	5.725

Wire—New York

Copper wire, cents per lb.	15.50
Rubber-covered wire, No. 14, per 1,000 ft.	$5.30
Weatherproof wire base, cents per lb.	15.25

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.75
Light copper, cents per lb.	10.00
Heavy yellow brass, cents per lb.	6.50
Zinc, old scrap, cents per lb.	2.00
Lead, cents per lb. (heavy)	4.00
Steel car axles, Chicago, net ton	$16.25
Cast iron car wheels, Chicago, gross ton	14.75
Rails (short), Chicago, gross ton	16.75
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	7.75

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

Volume 74 New York, June, 1930 *Number 6*

Annual Figures Encouraging

INDIVIDUALLY and collectively, the electric railways did well last year. In fact, 1929 was one of the most successful years in the history of the industry. This is shown not only by the annual reports abstracted in this issue and in the April number, but also by the combined statistics of the industry collected by the American Electric Railway Association, and summarized in this issue. Revenues were greater than in the previous year, and expenses were reduced appreciably. As a result, the gross and net income showed a material increase. The number of passengers carried on the rail lines and their subsidiary buses was about sixteen billions, or practically what it has been for the past several years, and fares averaged a little more.

Certainly no industry is dead or dying that is taking in an annual revenue of practically a billion dollars year after year, with only minor fluctuations. It should be obvious that a service such as this, paid for a few cents at a time day after day and by millions of people, must be an essential part of the national life. It is a service that cannot be withdrawn without leaving a gap that would be almost impossible to fill. In those few instances where transportation service has been withdrawn temporarily, the loss to the community has been so great that business and even social activities have been virtually at a standstill.

Not all sections of the country contribute equally to the demand for the service community transportation has to offer. Naturally the larger cities are most dependent on public transportation. Conversely, the rural districts need it the least. Last year the city systems made the best showing and the interurbans the poorest, but some of the interurbans which have developed an attractive freight service were able to make a profit.

With a record such as last year's behind it, the place of the electric railway in transportation seems assured for many years. As the country develops and congestion becomes greater, the need for public transportation is certain to increase. By aggressive leadership the present transportation lines surely can maintain the pace.

Educational Activities Lag

A STALEMATE apparently has been reached in the educational activities of the electric railway industry. For twenty years the A.E.R.A. committee on employee relations, or its predecessor, the committee on education, has urged the training of street railway personnel, particularly the platform men. More recently it has sponsored conference training groups at the annual convention of the association. The unanimous opinion of those who have attended these sessions has been that they are productive of much good. The entire program of the educational committee has been strongly supported by the executive committee, and its activities and recommendations have been approved. Despite this and other endorsements, the members of the committee were obliged to admit, at a recent meeting, that only a small number of railway executives had actually inaugurated educational programs on their own roads.

The great majority of managers, while personally rendering lip service to the work of the committee, has remained strangely apathetic about putting educational programs into effect. There seems to be an inertia in the industry which no amount of effort on the part of the committee has been able to overcome. It is another example of the truth of the old adage that you can lead a horse to water, but you cannot make him drink.

If an educational program were a matter involving any considerable expense, this attitude would be understandable. But it has been conclusively demonstrated that a modest but effective effort along the lines of employee training is not necessarily an expensive matter. Excellent results have been obtained on certain properties with little outlay other than the time of the executive or some of his assistants. An aggressive superintendent, intent upon getting the most out of his train force, can inaugurate and carry through a thoroughly successful conference training course at almost no cost.

Recently a prominent retail merchant made the statement that the organizations which will have the greatest success during the coming year will be those which have given the most attention to personnel training. This certainly applies with equal force to companies engaged in rendering local transportation service. It is never too late to begin. But the committee cannot do the work alone. It can only supply the ideas. The job of the individual companies is to put them into practice.

Compulsion or Persuasion

THAT pedestrian movement at street intersections is a factor of primary importance in traffic regulation, is generally recognized. Helter-skelter crossing of pedestrians in all directions at all times greatly retards the movement of wheel vehicles and adds materially to street traffic congestion. How to secure orderly pedestrian movement is the problem. Usually it has been attempted by the simple means of compulsion. Pedestrians have been ordered to obey the traffic lights under threat of more or less severe penalities if they disregard them. This method has worked fairly well when a sufficient number of policemen have been employed to compel observance of the rules. With policemen absent, however, the rules are generally more honored in the breach than in the observance. As it is practically impossible to provide sufficient policemen to watch all intersections,

Digitized by Google

this method of control has achieved no marked success.

Undismayed by the failure of compulsory pedestrian control in many other cities, Police Commissioner Whalen has just undertaken an attempt to enforce it in New York. His optimism compels admiration if his good judgment does not. Probably nowhere else in the United States are conditions less favorable than in New York for this type of pedestrian control. At a great many street intersections there is an enormous volume of pedestrian traffic. Old fashioned synchronized signal lights are operated on an extremely long cycle, generally two minutes for north and south movement and one minute for east and west movement. It is hardly likely that pedestrians will willingly wait two minutes for a green light before attempting to cross the street. Moreover, the fact that both right-hand and left-hand turns are permitted at nearly all intersections makes it almost as dangerous for a pedestrian to cross on a green light as on a red light. Altogether, it is safe to prophesy that the new rules will be observed only when the representatives of the law are on hand to enforce their observance.

In marked contrast to this unpromising enterprise is the method of pedestrian regulation adopted in Pittsburgh. There no attempt is made to compel adherence to the signal lights, but the intervals are so arranged as to encourage the pedestrians to thus utilize the green period. The total length of cycle is about 50 seconds divided into green and red periods according to the needs of the particular intersection. At the end of the green period is a short overlapping yellow clearance period. Thus the pedestrian has only a short wait and is assured of a safe crossing. The best indication of the merit of this plan is the fact that a large majority of pedestrians voluntarily follow the signal indications.

The Exception May Prove the Rule

SEVERAL important issues are involved in the recent rejection by the Indiana Public Service Commission of the proposed merger of various railway, light and power and other public utility properties, including the Terre Haute, Indianapolis & Eastern Traction Company and its subsidiaries. In its contention that each branch of the service should be self-supporting, the commission took a position in accordance with precedent and generally accepted opinion. From the evidence presented, the commission reached the conclusion that the electric railways would be unable to carry their share of the obligations of the merged properties and that an undue burden would thereby be placed upon the users of the other services. In reaching this conclusion, the commission was prejudging the case for railway operation under the new management, but was no doubt within its rights in so doing.

There were certain factors in this particular situation, however, to which it appears the commission might reasonably have given more weight than it did. In the past the Insull interests have shown a skill which amounts almost to wizardry in the restoration of electric railways which were generally regarded as hopeless. The rehabilitation of the Chicago, South Shore & South Bend Railroad is an outstanding example. While they did not guarantee that it would be possible to continue all of the interurbans included in the proposed merger, they did pledge themselves not to abandon lines until after "a fight backed by capital and a knowledge of transportation has been made to save them." To do this would doubtless have necessitated that earnings be plowed back into the properties for a time. Technically this would perhaps have run counter to the idea that each branch of the service should be self-supporting, but it might have saved transportation lines of immense value to the territories served. Much was at stake. Protection of the public is one of the primary functions of a regulatory commission, and if it believes that a merger is not in the public interest it can follow no other course than to refuse its permission. In this instance, however, good reason existed to hope that a successful solution of the transportation problem could be worked out. Under the circumstances, the onus will be largely on the commission for any curtailment of service and loss to investors through such further disintegration of the railway property as may well follow the state's negative decision.

Too Many Self-appointed Experts

WHEN we have a difficult financial question to answer we consult a banker. When we have a knotty legal problem to solve we consult a lawyer. Many people have frequent dealings with banks, but they do not profess to a technical knowledge of banking. Nor do they assume to be lawyers simply because they have sat in a courtroom. But when it comes to a question of transportation, rare in deed is the man who does not feel himself fully qualified to offer a solution of the most difficult problem.

Usually, when a city is faced with a difficult transportation problem, there exists a strange reluctance to consult an experienced transportation man to find a solution. Apparently the suggestions offered by the butcher, the baker and the candlestick maker are considered to be just as good as any technical advice. The idea seems to prevail that because a man uses the service or because he is dependent on it to bring customers to his store, he is fully qualified to pass judgment on any and all matters pertaining to public transportation.

The opinions of business men, of course, are not without value in studying the transportation problem. Just because a man is a good business executive, however, he is not necessarily qualified to offer practical advice on transportation matters. Usually, the self-appointed expert fails to realize that there are many sides to the problem, some of which are by no means evident at first glance. The side which seems most important to him may be least important to some one else whose situation and needs are entirely different from his. Agreement on what should be done is reached only if the butcher, the baker and the candlestick maker all have some interest in common. Such agreement, however, scarcely ever takes into consideration the views of other elements of the community. The logical procedure is to select a transportation man to solve a transportation problem. The proper solution of this problem is too important to the welfare of the entire community to be left in the hands of any business men's group or committee whose good intentions are exceeded only by their lack of experience.

Digitized by Google

Efficient Maintenance as a Revenue Producer

MAINTENANCE properly applied will surely yield a high return on the expenditure made. To accomplish this, however, it must be carried beyond the strictly mechanical aspect. The public must be conscious of the progressive effort to improve equipment and service for its comfort and convenience. The railway supervisor or shop foreman, as he rides the line, listens for the perfect purr of the car motors or bus engine, feels the effects of good brake adjustment and notices wheel alignment as a bus approaches him. The stenographer, the merchant and the shopper, however, take these things for granted. They notice the door that does not completely close, the buzzer buttons that do not operate, the grease left on a seat or hand strap, and the window that will not open.

Maintenance practices cannot be confined to periodic inspections, or to minor repairs and replacements for the purpose of getting the most work out of a car or bus. These are important and tend to overcome any loss in the economic value of a vehicle, but unless maintenance is definitely progressive in its encouragement of the riding habit, the vast amounts of money spent for this phase of operation are unproductive. To be progressive, maintenance must be constructive, must effect improvements in comfort, speed and convenience as well as in mechanical operation, and must result in equipment capable of competing in all respects with new vehicles of the latest standards.

Effective maintenance, from the standpoints of both the engineer and the public, depends fundamentally in making practical and thorough application of good maintenance theory. Undoubtedly every company includes in its program those details of inspection and repair that directly affect the economic phases of operation, as well as the refinements which the rider has come to demand, but the man on the job does not always realize the fact that the routine work for which he is responsible has a decided influence upon patronage. When he does, his efforts will result in a closer co-operation with the operating department, and many costly abuses of maintenance economies will be eliminated. The shop foreman, the mechanic and the car cleaner are producers of revenue.

Piling Up Bricks and Trouble

HIGHER, ever higher, rise the soaring skyscrapers in our large cities as ambitious building owners struggle to overtop their rivals. The marvel of yesterday is dwarfed by the new wonder of today, and this in turn is immediately surpassed by plans for the erection of an even taller edifice tomorrow. As an achievement in building construction this is perhaps very admirable, but as a tendency in civic development it may well occasion serious misgiving.

That high buildings have certain economic advantages cannot be denied. To a considerable extent, however, the owner of such a building secures these advantages at the expense of others. To obtain light and air for the workers in a skyscraper the light and air is cut off for those in adjacent lower buildings. The simplification of interior communication in a large building may result in savings for the tenants, but the consequent concentration of thousands of people in a small area adds enormously to the cost of providing adequate transportation facilities. This cost, however, is not paid directly by the building owner. If it were, it is not unlikely that much of the present enthusiasm for soaring towers would vanish overnight.

Concentration has now been carried to such a point in certain localities that safe and comfortable transportation of people to and from their work has become practically impossible. Transportation of goods, which is the lifeblood of industry, has been brought almost to a standstill by street congestion. Millions of dollars will be needed to build the various subways, elevated highways, bridges and tunnels which have been proposed as means of relieving this situation. Moreover, the degree of relief that they will afford is problematical. In fact, it is becoming increasingly clear that the only real hope of reducing congestion lies in reducing the volume of traffic which flows in and out of the business districts every day. So long as we continue to pile up bricks higher and higher, we are also piling up transportation troubles.

The West Coast Beckons

WITHOUT doubt one of the greatest benefits to be derived from convention attendance is the opportunity which it affords to establish contacts. Papers and reports can be read in the seclusion of the office or home. The spirit of the convention is adequately interpreted in the press. The full benefit of the informal but equally important discussions, however, can be had only by personal attendance. It is through intimate contacts established in the anterooms and hotel lobbies that much of the real business of the convention is accomplished. In this manner many of the policies of the industry are shaped and many of its major policies are settled.

It is not too much to say that the splendid spirit of mutual helpfulness which has characterized the meetings of executives throughout the Eastern section of the country has for years been a cogent force in shaping the destinies of the transportation business. The exchange of suggestions, ideas and advice, inspired by problems of mutual interest and encouraged by a spirit of fellowship developed through close association, has gone far to sustain a confidence in the essential stability of the industry.

An opportunity now presents itself to broaden the scope of these associations by a more general inclusion of executives from the West Coast. New problems, new ways of meeting them, new horizons to explore, await the delegates to the San Francisco meeting in June. An extremely interesting program of papers, luncheons and informal discussions has been arranged by the convention committee. There will also be plenty of time for establishing those personal contacts which have proved to be of such immeasurable value.

Western executives have lent their presence in considerable numbers at the Eastern meetings of the association. Year after year they have crossed the country to attend sessions at Cleveland or Atlantic City. They have given liberally of their time, ideas and experience in attending meetings of the various committees. Now is the time for Eastern executives to reciprocate.

Digitized by Google

At several important junction points vehicle traffic is excluded from the car tracks to facilitate movement

Berlin Transportation

By

WALTER BRESLAUER
Ph.D.

Some lines even in the center of the city are on private right-of-way

FAR-REACHING changes have been made in the Berlin transit situation during the last two or three years. For one thing, the Hoch-und-Untergrundbahn (elevated and subway rapid transit railway) has been consolidated with the street car and bus lines to form a unified system. This is the outstanding event in the transportation field in the city. Then, too, the Stadt, Ring & Vorortbahn (city, belt and suburban railway system), which is a branch of the German state railway system, has been electrified to form a modern high-speed local system within the city. It supplements the rapid transit lines to round out the unified service.

Surface car service was consolidated and taken over by the municipality many years ago, and more recently was assigned for operation to a municipal street railway operating company, while the city retained direct ownership of the plant and rolling stock. The Berlin Omnibus Company, formerly a private corporation, has gradually come under municipal domination as the stock has been acquired by the city, which now owns 90 per cent of all the outstanding shares. The same process of acquiring stock brought the rapid transit company under municipal control.

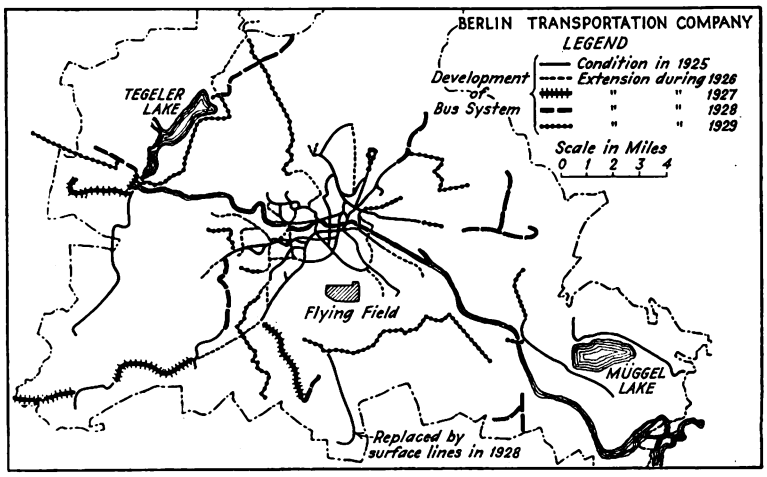
When it was desired to form a consolidated transportation company the city, owning 75 per cent of the stock of these companies, acquired the remaining assets and obtained full control of the rapid transit and bus companies. Under the plan of organization adopted by the City Council, the new Berlin Transportation Company, with a capital of 400,000,000 marks ($100,000,000) has all the features of a private corporation. There is a board of directors, selected from the City Council and the Board of Aldermen, and a set of corporate officers. Herr Reuter, who visited the United States last year, is chairman of the Board of Directors.

Prior to the formation of the new company, but after the city had obtained a large measure of control, there had been a working agreement among the three companies. The plan then in force was discussed in an article by Henry W. Blake in ELECTRIC RAILWAY JOURNAL for Sept. 24, 1927. Zone fares and class fares were eliminated and a flat fare of 20 pfennige (5 cents) with one free transfer was adopted. Due to lack of bus capacity transfers to the buses from the rail lines were not given, but in January, 1928, this privilege was extended. At the same time a limited transfer was given between the local zone district of the Stadtbahn and the city lines.

At the present time, each passenger receives a ticket

Digitized by Google

Combination of surface lines, rapid transit and buses has eliminated duplication of service. Universal transfer system has proved of great benefit to the public as well as operators. Extensive construction program for rapid transit system planned to provide adequate service for outlying districts. New surface cars designed to speed up schedules



Extensions to the city bus lines have been made each year since the co-ordinated system was established

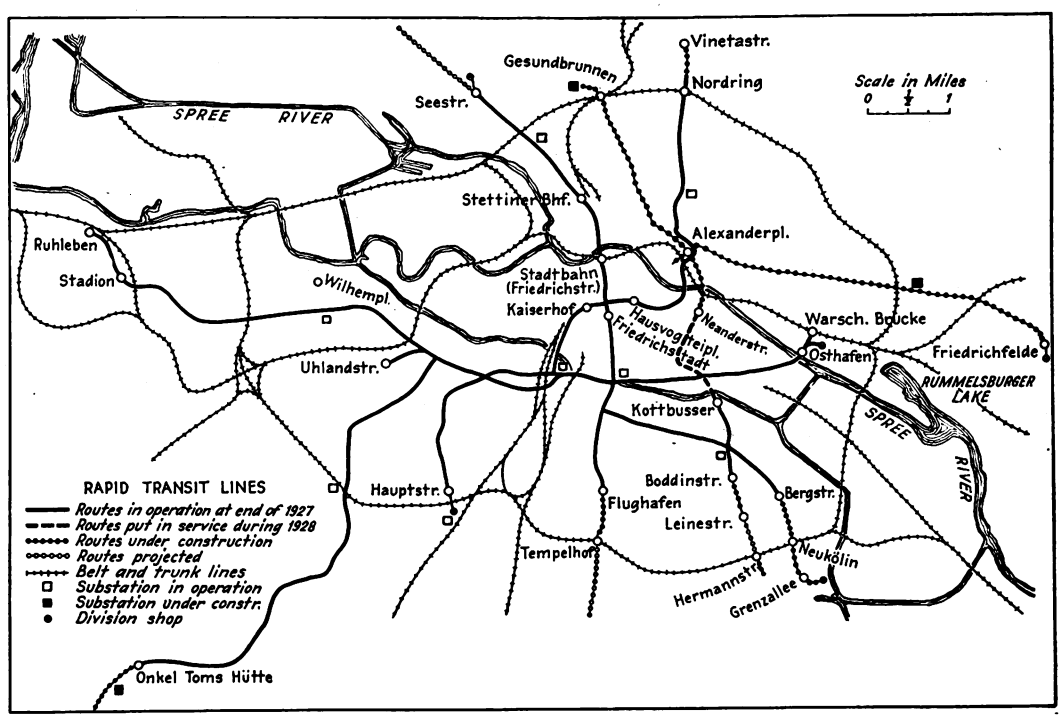
Facilities Co-ordinated

entitling him to one free transfer for similar service on either of the two other systems. Changing trains in prepayment areas is not considered as a transfer. Tickets including a ride on the Stadtbahn system and one on the municipal system are sold for 30 pfennige (7½ cents). The transfer ticket is good for 1½ hours after issue. Monthly card tickets good on one or more surface lines or on the rapid transit system are issued at various rates. At the present time 25 per cent of the rides on the Berlin system are with monthly tickets.

Extension of the fare privileges increased the use of the system a great deal. In 1926 the riding habit was about 266 rides per capita. In 1927 it had increased to 291 and in 1928 to 325.

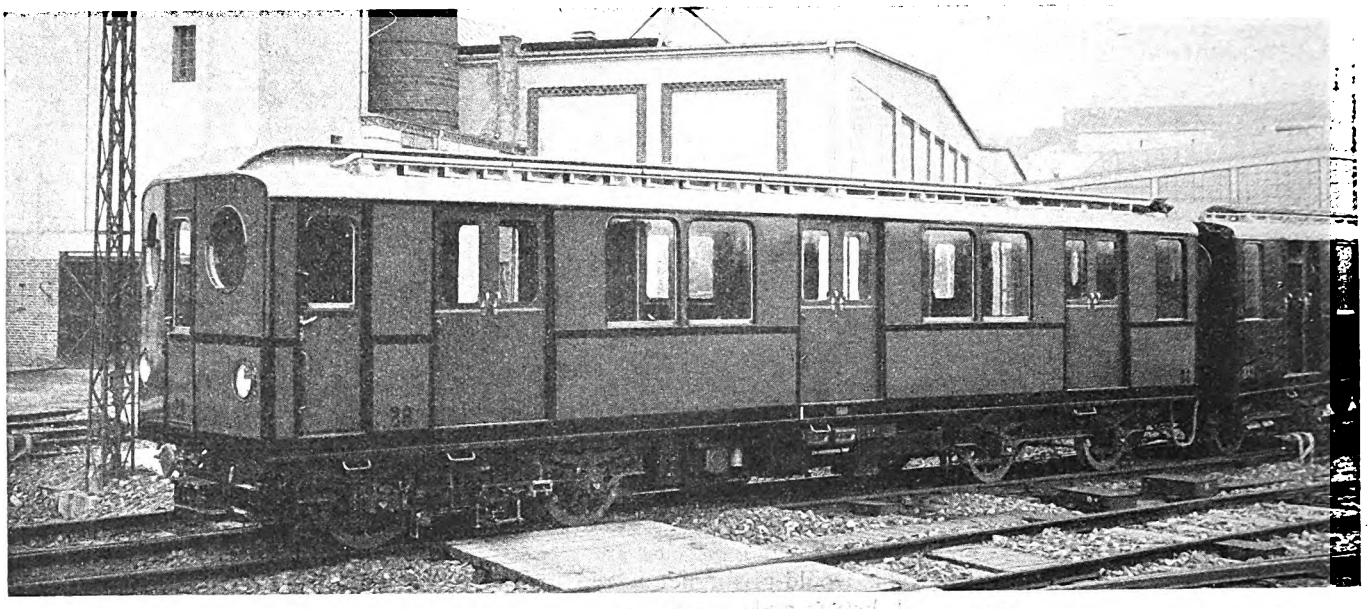
In order to improve the financial situation fares were raised on Jan. 1, 1929, to 25 pfennige (6 cents), with corresponding increases in the ticket rates. The Stadtbahn made a similar increase in order to reduce its deficit. Despite these advances in fares traffic continued to grow, as may be seen from Table I. A great part of the expansion has been on the bus system. More buses have been added, particularly in the suburban districts. On the other hand, the flat fare has likewise increased the riding on the rapid transit lines, as many passengers now use other means of transportation for a portion of the trip.

The growth of traffic on the rapid transit lines has been so great that it has been necessary to improve the



The rapid transit system in Berlin has been expanded greatly and now serves all parts of the city

Digitized by Google



Steel side-entrance cars are used on some of the Berlin rapid transit lines

service a great deal. Trains have been increased from six to eight cars. To do this it was necessary to lengthen a number of the station platforms. Schedules have also been speeded up. It is noteworthy that an increase in traffic of 50 per cent on the rapid transit lines was handled with a 10 per cent increase in staff. The longer trains, faster schedules, and the adoption of labor-saving devices, particularly in the fare collecting system, made this possible. There has been an increase in the maximum wage of 25 per cent during the same period, so that part of the gain has been absorbed in that manner.

Consolidation of the services has made it possible to eliminate costly duplication of car mileage and competitive methods. The universal transfer system has increased the riding, however, without a corresponding increase in revenue. Originally the bus lines, which belonged to a competing company, in many instances ran parallel to street car lines. After the consolidation new bus lines were installed only in the suburbs and as cross-town lines. No general rearrangement of the routes has been attempted as yet, although it is felt that some general plan will have to be worked out which will get the most out of the service and at the same time be popular with the riders.

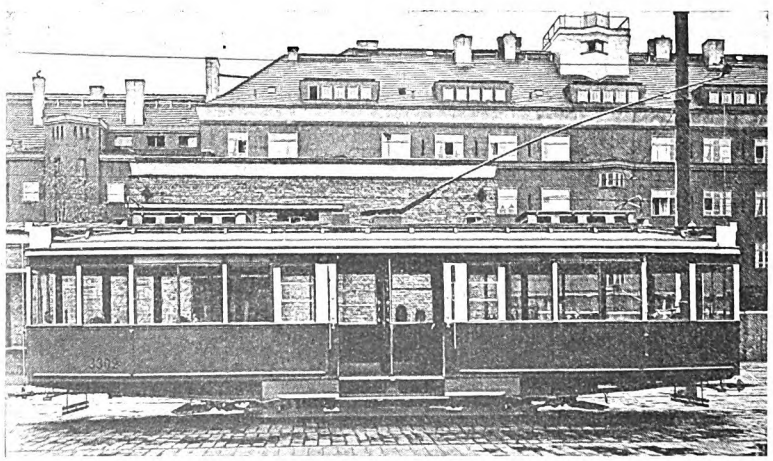
For the year 1928, operating expenses per surface car-mile were 18.5 cents, per rapid transit car-mile 20 cents, and per bus-mile 31 cents. Although there seems to be a preference for buses on the part of the riding public, it is easy to see that the management does not favor wholesale expansion of the bus system under existing conditions. New six-wheel buses with pneumatic tires, seating 75 passengers, have been exceedingly popular,

Table I—Passengers Carried by Berlin Municipal Transit System, 1927-29

	1929	1928	1927
Street cars	929,000,000	672,800,000	714,100,000
Rapid transit lines	277,200,000	125,800,000	132,600,000
Buses	277,100,000	120,800,000	122,500,000
Stadtbahn system	444,300,000	415,100,000	.....
Total	1,927,600,000	1,334,500,000	.....

Table II—Service Operated by Berlin Transportation Agencies, 1926-28

	Car Miles		
	1928	1927	1926
Street cars	105,000,000	99,000,000	98,000,000
Buses	23,000,000	18,000,000	14,000,000
Rapid transit lines	33,000,000	27,000,000	23,000,000



One of the latest single-truck surface cars used in Berlin

although the speed does not exceed that of the surface cars.

It is apparent that the surface cars are the backbone of the Berlin transportation system, and will remain so for a long time to come. Yielding the largest surplus, this service will be improved steadily and extended into the suburbs as fast as the traffic warrants. The installation of heavier motor equipment has made it possible to speed up the schedules, and construction of tracks on private right-of-way in the middle of many boulevards has eliminated interference from vehicular traffic. Unfortunately, the narrow streets and sharp curves offer a severe handicap to the introduction of longer, large capacity American-type cars, particularly in the downtown district. However, 300 new cars with multiple-unit control have recently been placed in service, and it is expected

Digitized by Google

that eventually the use of small single-truck trailers will be discontinued.

It is the intention of the city and the transportation company to proceed as soon as possible to the construction of new subway lines. With a traffic increase of 1,000 per cent and a steady growth in number of buses and surface cars, congestion on important thoroughfares in the downtown district has reached a point where the diversion of mass transportation into subways appears imperative. Berlin's population in 1926 was approximately 4,000,000. It is growing at the rate of 80,000 per year, and the city limits have been extended greatly since the end of the war. There still is a considerable shortage in dwellings, and a development of outlying residential districts is under way. Adequate transportation facilities to these new suburban districts is one of the main problems of the management.

A plan for an enlarged rapid transit system to be built within fifteen to twenty years at an estimated cost of about one billion marks has been prepared and placed before the municipal authorities. This would give relief to the overtaxed lines in the central district and provide for extensions of existing lines to points where connections with the surface systems can be made for distribution in the residential sections. In view of the present financial situation in the city, no action has been taken, and it is doubtful just when the work will be authorized.

The plan takes into consideration the value of the electrified Stadtbahn, which is now furnishing a large amount of rapid transit service. While co-ordination has been effected, as mentioned, consolidation with the city system is still far off.

The rapid transit plan proposed would be carried out in three parts, as follows:

1. Completion during 1930 of subway construction under way, consisting principally of a second north-south line, with a branch serving the densely populated district east of Alexanderplatz (13.6 miles of double track).

2. Construction of two new lines, one northeast-southwest, and one extending the eastern line to a point farther southwest, intersecting each other at Potsdammer Platz and with the existing rapid transit trunk line and also the proposed north-south subway connection of the Stadtbahn (10.5 miles).

3. Construction of additional subways to make the system more comprehensive and reaching all important sections of the city (41.5 miles).

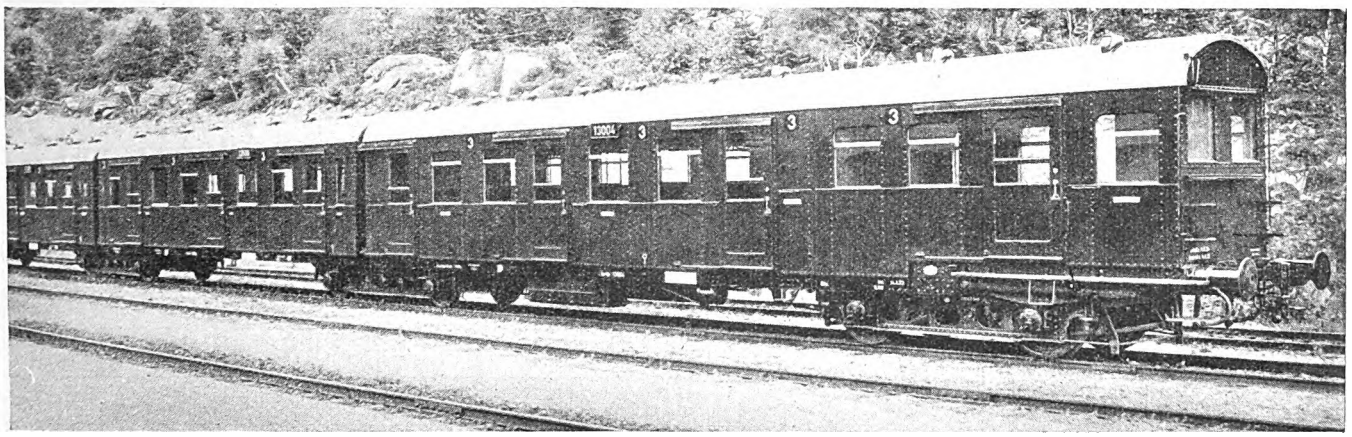
There is some question as to the desirability of continuing the flat fare with universal transfers. The situation in Berlin differs materially from those existing in American cities. Most of the passengers on all three transit systems are long haul riders. Even including the universal transfers the average length of ride on the street cars is 2.6 miles, on the buses 2.9 miles and on the rapid transit lines 3.5 miles. These figures, it is held, justify the same rate of fare on each of the systems. The principal reason advanced for continuance of the flat fare system is that public funds are used to develop outlying residential areas, and it is desired to stimulate them through low-priced transportation. Similar considerations account for the method of financing for new subways. Under the present housing regulations, with rentals fixed and taxed by the government, and under precarious economic conditions which restrict real estate values, the cost of subway construction cannot be assessed against the benefited property. Only in one stance, that of the Dahlem-Zehlendorf extension, can a large increase in the land values be anticipated. In consequence the owners, the Prussian state and a private concern which is developing this district as a new residential area, will have to pay the greater part of the cost of this open-cut line.

Table V—Revenues and Expenses per Passenger in Cents

	1928	1927	1926
Average receipts per passenger	3.4	3.7	4.2
Expenses per passenger, including taxes	2.8	3.5	3.0

Table VI—Number of Employees of Berlin System

	Dec. 31, 1928	Dec. 31, 1926
Street cars	14,406	13,735
Buses	4,546	2,840
Rapid transit	7,020	6,050
Total	25,972	22, 25



Articulated trains are run into the suburbs on the rapid transit lines of the Berlin system

Table III—Number of Vehicles Owned by Berlin System, 1926-29

	1929	1928	1927	1926
Surface motor cars	2,159	1,859	1,880	....
Surface trailer cars	....	1,789	1,761	....
Buses	788	620	561	450
Rapid transit cars	1,233	997	828	793

Table IV—Length of Routes and Track, Berlin Municipal Lines

	1929	1925
All bus lines operated, miles	210	113
All street car lines, miles	1,025	885
Street car lines, miles double track	405	360

Digitized by Google

Many More Railway Reports Show Gains in 1929

EARNINGS reports from 45 properties for the year 1929, as compared with 1928, are presented herewith. These supplement the reports from 65 companies published in this paper for April, 1930, page 204. Taken together, they present the financial record of the year for a large portion of the industry.

Only reports of railway or bus operating companies are included. In a few instances, where the railway figures of a combined property are given separately, they have been shown. It has been the aim to exclude auxiliary operations such as light and power or gas manufacture. Since a number of important railway systems which are part of larger utility properties do not publish separate reports, it has not been possible to give the financial results. A considerable number of the annual statements do not separate taxes from operating expenses. Whenever the information could be obtained, these items are shown separately in the tables.

In general, the trends shown in the previous article hold for the additional companies listed herewith. Out of a total of 100 reports for which comparisons between the two years can be made, 48 have shown an increase in operating revenue against 52 on which there have been decreases. Operating expenses have been decreased on 57 properties and increased on the remaining 43. As a result of the combination of these trends, 53 companies showed an increase in operating income last year, as against 47 which suffered a reduction. The improvement in income was by no means confined to large properties, but was fairly well distributed throughout the range.

CONDENSED FINANCIAL REPORTS OF ELECTRIC RAILWAY PROPERTIES, 1929-1928

	Fort Smith Traction Co., Fort Smith, Ark.		Visalia Electric R.R., Exeter, Cal.		Bakersfield & Kern Electric Ry., Fresno, Cal.		Fresno Traction Co., Fresno, Cal.		Los Angeles Railway, Los Angeles, Cal.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$154,118	$180,310	$192,777	$241,726	$88,816	$92,433	$286,688	$311,897	$14,874,309	$13,175,162
Railway operating expenses	142,373[1]	158,684[1]	99,832	115,529	96,724	96,418	279,667	300,561	11,222,861	11,002,575
Net revenue, railway oper.	.....	.....	$92,945	$126,197	*$7,907*	*$3,985*	$7,020	$11,335	$3,651,448	$2,172,587
Taxes	.....	.....	18,192	26,618	6,358	6,728	17,956	19,053	997,391	833,675
Operating income	$11,745	$21,626	$74,752	$99,578	*$14,265*	*$10,714*	*$10,935*	*$7,718*	$2,654,056	$1,338,912
Non-operating income	.....	.....	6,746	1,385	15	.....	7,037	6,296	*159,849*	*180,950*
Gross income	.....	.....	$81,498	$100,963	*$14,250*	*$10,714*	*$17,972*	*$14,014*	$2,494,207	$1,157,962
Deductions from gross income	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Net income	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Operating ratio	.....	.....	0.511	0.519	1.089	1.043	0.979	0.976	0.755	0.835

	Pacific Electric Ry., Los Angeles, Cal.		San Francisco, Napa & Calistoga Ry., Napa, Cal.		Sacramento Northern Ry., Sacramento, Cal.		San Diego Electric Railway, San Diego, Cal.		California St. Cable R.R., San Francisco, Cal.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$18,417,335	$18,310,987	$215,888	$215,481	$2,104,366	$1,477,452	$1,624,534	$1,659,768	$494,344	$514,109
Railway operating expenses	15,499,320	15,876,041	166,562	157,789	2,051,669	1,185,104	1,356,560	1,384,800	432,936	447,230
Net revenue, railway oper.	$2,918,014	$2,434,946	$49,325	$57,691	$52,696	$292,347	$267,973	$274,967	$61,408	$66,879
Taxes	1,112,611	1,138,742	11,685	12,098	130,493	90,569	163,686	120,087	34,561	33,431
Operating income	$1,805,403	$1,296,204	$37,639	$45,592	*$77,797*	$201,778	$104,287	$154,880	$26,846	$33,447
Non-operating income	281,931	238,645	*$16,346*	*$13,143*	76,624	51,728	110,967	96,944	12,466	13,553
Gross income	$2,087,334	$1,534,849	$21,293	$32,449	*$1,173*	$263,506	$215,254	$251,824	$39,312	$47,000
Deductions from gross income	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Net income	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Operating ratio	0.841	0.867	0.771	0.732	0.975	0.802	0.835	0.834	0.876	0.870

	Central California Traction Co., San Francisco, Cal.		Northwestern Pacific R.R., San Francisco, Cal.		Peninsular Railway, San Jose, Cal.		San Jose Railroads, San Jose, Cal.		Stockton Electric Railroad, Stockton, Cal.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$390,893	$445,048	$6,186,763	$6,355,971	$228,764	$239,178	$349,061	$359,326	$278,471	$296,727
Railway operating expenses	441,620	435,103	5,384,886	5,732,204	264,201	313,683	293,199	295,035	227,480	247,038
Net revenue, railway oper.	*$50,727*	$9,945	$801,876	$623,766	*$35,436*	*$74,504*	$55,862	$64,290	$50,991	$49,688
Taxes	26,082	17,315	449,433	478,960	11,964	11,825	23,693	24,231	20,340	20,777
Operating income	*$76,809*	*$7,369*	$352,442	$144,805	*$47,401*	*$86,329*	$32,169	$40,058	$30,650	$28,911
Non-operating income	247,186	680	*43,679*	*61,537*	38,564	37,109	1,857	1,912	505	846
Gross income	$170,377	*$6,689*	$308,763	$82,268	*$8,837*	*$49,220*	$34,026	$41,970	$31,155	$29,757
Deductions from gross income	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Net income	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Operating ratio	1.129	0.977	0.870	0.902	1.111	1.311	0.840	0.821	0.817	0.833

	Tidewater Southern Ry., Stockton, Cal.		Chicago, Aurora & Elgin R.R., Aurora, Ill.		United Rys. & Electric Co., Baltimore, Md.[18]		Boston, Worcester & N. Y. St. Ry., Framingham, Mass.		Berkshire Street Railway, Pittsfield, Mass.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$308,853	$349,361	$2,807,829	$2,802,845	$16,718,321	$16,273,825	741,023	721,928	$718,069	$739,215
Railway operating expenses	279,268	241,133	2,426,219	2,447,259	11,329,137	10,885,708	609,268[35]	594,734[45]	612,420	610,286
Net revenue, railway oper.	$29,585	$108,228	$381,610	$355,586	$5,389,184	$5,388,117	89,702	93,841	$105,649	$128,929
Taxes	26,057	30,860	118,097	121,295	1,659,968	1,573,061	18,294	21,116	21,011	30,534
Operating income	$3,528	$77,367	$257,298[20]	$227,854[20]	$3,729,215	$3,809,056	71,408	72,725	$83,739	$98,495
Non-operating income	7,163	2,194	292,712	249,266	198,667	175,041	12,816	2,496	3,010	1,857
Gross income	$10,691	$79,561	$550,010	$447,120	$3,927,882	$3,984,097	84,224	75,221	$86,749	$100,352
Deductions from gross income	.....	.....	476,098	439,072	3,385,495	3,410,955	55,408	56,752	292,527	296,324
Net income	.....	.....	$73,912	$8,048	$542,387	$573,142	18,816	18,469	*$205,778*	*$195,972*
Operating ratio	0.904	0.690	0.864	0.873	0.677	0.669	.....	.....	0.853	0.826

Digitized by Google

CONDENSED FINANCIAL REPORTS OF ELECTRIC RAILWAY PROPERTIES, 1929-1928 *(Concluded)*

	Springfield Street Ry., Springfield, Mass.		Worcester Consolidated Street Ry., Worcester, Mass.		Kansas City, Clay Co. & St. Joseph Ry., Kansas City, Mo.		St. Louis Public Service Co., St. Louis, Mo. (Revised)		Omaha & Council Bluffs Street Ry., Omaha, Neb.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$2,719,696	$2,789,846	$3,068,691	$3,116,623	$698,527	$701,526	$19,703,101	$19,805,490	$3,896,821	$3,696,846
Railway operating expenses	2,191,364	2,197,844	2,379,423	2,443,856	580,706[1]	558,863[1]	14,898,843	15,027,072	2,507,815	2,370,290
Net revenue, railway oper.	$528,332	$592,002	$689,268	$672,767	.....	.....	$4,804,258	$4,778,418	$1,389,046	$1,326,556
Taxes	37,837	31,330	74,937	72,284	.....	.....	1,947,780	1,877,808	419,841	377,197
Operating income	$490,495	$560,672	$614,331	$598,483	$117,821	$142,663	$2,856,478	$2,900,610	$969,166	[4]$350,681
Non-operating income	8,892	6,348	24,685	21,831	5,457	9,554	58,902	12,278	68,004	39,937
Gross income	$499,387	$567,020	$639,015	$620,314	$123,278	$152,217	$2,915,380	$2,192,888	$1,037,170	$390,618
Deductions from gross income	290,341	284,916	454,965	420,277	139,750	147,477	.....	.....	798,684	787,812
Net income	$209,046	$282,104	$184,050	$150,036	*$16,483*	$4,740	$1,065,478	$1,039,723	$238,476	*$397,195*
Operating ratio	0.806	0.788	0.775	0.784	.....	.....	0.756	0.759	0.643	0.641

	Hudson & Manhattan R.R., New York, N.Y. (Revised)		Interborough Rapid Transit Co., New York, N.Y.[19]		Long Island Railroad, New York, N.Y.		New York Transportation Co., New York, N.Y.[3]		New York State Railways, Rochester, N.Y.	
	1929	1928	1929[9]	1928[9]	1929	1928	1929	1928	1929	1928
Railway operating revenues	$8,964,656	$8,925,508	$69,174,294	$67,205,294	$41,326,194	$40,532,572	$6,730,730	$7,703,314	$9,126,523	$9,658,535
Railway operating expenses	3,800,775	3,907,181	39,084,146	37,712,711	27,734,679	28,434,356	5,465,586	5,731,454	7,623,293	7,445,011
Net revenue, railway oper.	$5,163,881	$5,018,328	$30,090,148	$29,492,582	$13,591,515	$12,098,215	$1,265,144	$1,971,860	$1,563,231	$2,213,523
Taxes	950,433	1,008,958	2,393,735	3,200,615	2,942,186	2,707,707	519,611	486,544	571,135	583,732
Operating income	$5,827,438[6]	$5,564,052[6]	$27,696,413	$26,291,966	$10,649,328	$9,390,508	$745,333	$855,316	$932,061	$1,630,459
Non-operating income	442,221	399,231	561,435	297,026	899,575	834,258	234,175	192,509	105,340	30,997
Gross income	$6,269,660	$5,963,283	$28,257,848	$26,588,993	$9,607,518[22]	$8,376,717[22]	$979,708	$1,047,825	$1,037,402	$1,661,456
Deductions from gross income	4,022,450	4,022,226	21,989,632	21,622,776	3,253,842	3,694,060	8,250	3,563	1,501,390	1,501,899
Net income	$2,247,210	$1,941,057	$6,268,216	$4,966,216	$6,353,676	$4,682,656	$971,458	$1,044,262	*$463,987*	$159,556
Operating ratio	0.424	0.438	0.565	0.561	0.671	0.701	0.812	0.744	0.835	0.781

	Cincinnati Street Ry., Cincinnati, Ohio		Cincinnati, Hamilton & Dayton Ry., Dayton, Ohio[7]		Lake Shore Electric Ry., Sandusky, Ohio		Oklahoma Railway, Oklahoma City, Okla.		Lehigh Valley Transit Co., Allentown, Pa.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$8,819,944	$8,819,116	$1,182,055	$1,151,905	$1,871,693	$1,899,166	$2,289,887	$2,011,522	$4,220,636	$4,314,937
Railway operating expenses	6,021,349	6,320,173	983,751[1]	951,496[1]	1,704,566[1]	1,644,867[1]	1,853,508	1,640,139	3,022,681[1]	[13]3,199,996
Net revenue, railway oper.	$2,798,594	$2,498,943	.....	.....	.....	.....	$436,379	$371,413	.....	.....
Taxes	693,268	747,318	.....	.....	.....	.....	71,761	73,817	.....	.....
Operating income	$2,105,325	$1,751,624	$198,304	$200,409	*$100,873*[11]	*$13,701*[11]	$364,618	$297,596	$1,197,954	$1,114,941
Non-operating income	24,788	27,549	3,834	19,379	.....	.....	41,783	46,492	177,941	143,610
Gross income	$2,130,114	$1,779,174	$202,139	$219,788	*$100,873*	*$13,701*	$406,401	$344,088	$1,375,896	$1,258,551
Deductions from gross income	2,126,609	1,764,380	129,721	144,249	354,651	336,639	274,836	266,717	873,691	834,176
Net income	$3,504	$14,793	$72,418	$75,539	*$455,524*	*$350,340*	$131,565	$77,371	$502,204	$424,375
Operating ratio	0.683	0.717	.....	.....	.....	.....	0.809	0.800	.....	.....

	Beaver Valley Motor Coach Co., New Brighton, Pa.		Beaver Valley Traction Co.,[12] New Brighton, Pa.		Pittsburgh Motor Coach Co., Pittsburgh, Pa.		Pittsburgh Railways, Pittsburgh, Pa.		York Railways, York, Pa.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$108,618	$103,402	$540,440	$538,205	$887,072	$728,211	$20,258,007	$20,576,466	$2,841,235	$2,688,243
Railway operating expenses	85,381	81,940	359,220	369,300	703,583	543,644	15,272,740	15,627,144	1,637,375[1]	[1]1,510,298
Net revenue, railway oper.	$23,237	$21,461	$181,220	$168,905	$183,488	$184,567	$4,985,267	$4,949,322	.....	.....
Taxes	577	2,808	4,303	7,466	6,185	21,282	535,459	569,624	.....	.....
Operating income	$22,660	$18,653	$176,917	$161,439	$177,303	$163,284	$4,449,808	$4,379,698	$926,217	$901,127
Non-operating income	6	20	2,905	4,071	5,989	1,493	106,566	118,618	94,356	76,519
Gross income	$22,666	$18,673	$179,822	$165,510	$183,292	$164,778	$4,556,374	$4,498,316	$1,020,573	$977,646
Deductions from gross income	14,852[15]	16,864[15]	175,801[13]	163,006[13]	169,479[14]	137,657[14]	4,540,469	4,487,830	250,586	253,135
Net income	$7,814	$1,809	$4,020	$2,504	$13,813	$27,120	$15,904	$10,486	$769,987	$724,511
Operating ratio	0.786	0.792	0.665	0.686	0.793	0.747	0.754	0.760	.....	.....

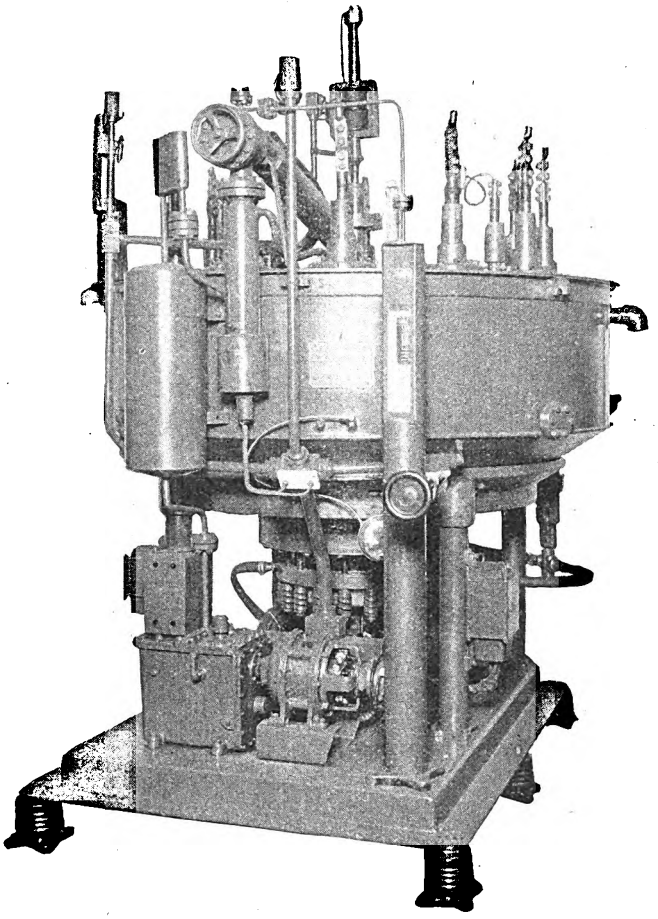
	Seattle Municipal St. Ry., Seattle, Wash.		London Street Railway, London, Ont.		Saskatoon Municipal Ry., Saskatoon, Sask.		Buenos Ayres Lacroze Tramways, Buenos Ayres, Argentina, S.A.[10]		Brisbane Tramways Department, Brisbane, Australia	
	1929	1928	1929	1928	1929	1928	1929[9]	1928[9]	1929	1928
Railway operating revenues	5,556,242	5,627,098	$592,844	$618,961	$396,282	.....	7,890,071	7,973,709	£794,470	£810,954
Railway operating expenses	4,705,739	4,793,340	495,219	519,690[1]	260,179	.....	5,096,734	5,199,833	584,390	607,711
Net revenue, railway oper.	850,503	833,708	$97,625	.....	$136,103	.....	.....	.....	£210,080	£203,243
Taxes	.....	.....	11,471	.....	15,557	.....	.....	.....	[21]	[21]
Operating income	850,503	833,758	$86,154	$99,271	$546	.....	2,793,337	2,773,876	£210,080	£203,243
Non-operating income	9,046	24,936	*51,625*[2]	*48,625*[2]	.....	.....	.....	.....	.....	.....
Gross income	859,549	858,694	$34,529	$50,646	$92,544	.....	2,793,337	2,773,876	£210,080	£203,243
Deductions from gross income	612,394	647,082	31,199	44,165	106,218	.....	1,426,384	1,550,901	202,474	197,125
Net income	247,155	211,612	$3,330	$6,481	$14,326	$12,304	1,366,953	1,222,975	£7,606	£6,118
Operating ratio	0.847	0.852	0.835	.....	0.657	.....	.....	.....	.....	.....

[1]Includes taxes. [2]Depreciation. [3]Excluding New York Railways Corporation. [4]Depreciation of $598,678 deducted. [5]Before depreciation. [6]Includes net income other than railway operations, $1,613,991 in 1930 and $1,554,683 in 1929. [7]Name changed to Cincinnati & Lake Erie R.R. Jan. 1, 1930. [8]After depreciation of $616,799 in 1929 and $571,033 in 1928. [9]Years ended June 30. [10]Figures are in Argentine paper pesos. [11]After depreciation of $268,000 in each year. [12]Including Pittsburgh & Beaver Street Ry. [13]Includes depreciation of $48,457 in 1929 and $42,569 in 1928. [14]Includes depreciation of $144,115 in 1929 and $117,103 in 1928. [15]Includes depreciation of $12,426 in 1929 and $14,091 in 1928. [18]Revised statement. [19]On the basis of the preferential deficits under Contract No. 3 and the Elevated extensions certificate without regard to the objections made by the Transit Commission to certain items in the accounting. [20]After deducting loss of auxiliary operations, $6,215 in 1929 and $6,397 in 1928. [21]No taxes are charged against operation. [22]After deducting equipment and joint facility rents.

Digitized by Google

Digitized by Google

Development in Design and Manufacture Have Made Possible the Construction of Rectifiers of Large Ratings and High Voltages. These Machines Are Now Suitable for Installations Where Synchronous Converters Previously Were Considered Necessary



General appearance of a 1,000-kw., 600-volt mercury arc rectifier

Mercury Arc Rectifiers Meet Transportation Demands

By

C. E. BAKER

Transportation Engineering Department
General Electric Company
Erie, Pa.

WHILE the principle of the mercury vapor rectifier was discovered about the end of the last century, it is only within recent years that it has progressed very far beyond the status of laboratory equipment. Today, however, it is being built to do work which formerly was considered about the limit possible with synchronous converters or motor-generator sets. In the commercial sizes its performance is equal to or better than that of the best rotating equipment so far designed.

Since the principal part of the loss in the mercury converter is the result of a constant drop in potential between the electrodes, it follows that the efficiency is nearly the same at all loads. In sharp contrast with rotating machinery, the efficiency is very high at light loads. Accordingly, the rectifier is of particular advantage where the load factor is low. This characteristic fits in particularly well for railway work, in which the fluctuations of current are large and the load factor runs from 25 to 50 per cent. Normally, the voltage regulation of a rectifier is approximately 5 per cent over almost the entire range of loads. The power factor is not subject to adjustment as with synchronous machinery, but is approximately 95 per cent over the range from three-quarters to one and one-half times full load, dropping off somewhat as the load is decreased beyond the lower limit. The power factor is due partly to wave distortion and consequently is not a true measure of the reactive current in the transmission system. Furthermore, the frequency of the system does not in any way affect the operation of the rectifier. Of course the auxiliary equipment must be designed for the frequency on which the rectifier is to be operated.

Since the voltage drop within the rectifier is more or less constant, depending on the internal design, it follows that the rectifier has higher efficiency almost in direct proportion to the voltage impressed on it. Accordingly, the higher the voltage the higher the efficiency of conversion in the rectifier. Commercial rectifiers are being built for 3,000-volt direct curent, but this is by

Digitized by Google

Digitized by Google

vided with an additional circular cooling chamber or dome rising from the vacuum chamber inside the ring of anodes. Further provision for cooling can be obtained by the use of auxiliary cooling coils in the dome or vacuum chamber.

Condensation of the mercury vapor occurs at all points on or near the walls of the chamber. Consequently, the chamber must be so designed that the condensed mercury will drain back immediately into the cathode. Mercury which is allowed to trap in any portion of the chamber other than the cathode is a hazard as under certain conditions it may attempt to function as a second cathode.

Air-Tight Seals Essential to Operation

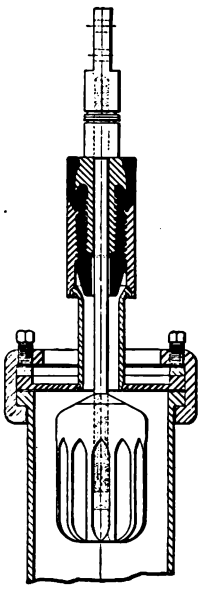
The anodes and cathode of a rectifier must be insulated from the vacuum chamber. Some of the most perplexing problems in the development of the rectifier have been in connection with the production of an insulator which will withstand high mechanical and electrical stresses and at the same time maintain a high degree of vacuum. Numerous plans have been tried, the most common of which employ porcelain as the insulating material. With this design the anode is supported by a flange resting between two percelain insulators, the whole being tightly clamped to the anode flange of the vacuum chamber. Gaskets of soft metal placed on each side of the porcelain insulators aid in obtaining a tight joint. Due largely to the unequal expansion and contraction of the iron and porcelain there is almost constant leakage through the insulator system. Several methods have been employed to reduce this leakage. One is to provide a groove in the surfaces which comprise the seals and maintain a vacuum in this groove. Another method is to provide a groove and keep it filled with mercury so that any leakage into the vacuum chamber will be of mercury instead of air.

An attempt to obtain a better insulator and seal was made by using a glass cylinder to support the anode, the glass actually being welded to the metal anode stem and flange. In this way a tight seal was made, but it was not mechanically rugged. Later developments have resulted in the production of a simple and effective insulator and seal in which the anode is joined to and effectively insulated from its supporting sleeve by vitreous insulation molded in place under high temperature and pressure.

Usually the cathode insulator has been a porcelain ring with soft metal gaskets to make the junction vacuum tight. Inasmuch as the cathode is not subjected to the high and fluctuating temperatures that exist at the anode, this construction has been fairly satisfactory. However, it is quite probable that other insulators with more mechanical strength soon will be available.

The operation of the rectifier is dependent on the emission of electrons from the mercury pool or cathode which are attracted to the positively charged anode. If mercury is permitted to lodge or condense on an anode, it is very likely to emit electrons, changing the anode into a cathode and resulting in an arc-back. Baffles or shields are therefore arranged to protect the anodes from mercury splash from the cathode, and the anode construction must be such that mercury cannot condense on them. There is a possibility of mercury condensing on an anode when the load is not sufficient to keep its temperature high enough. Accordingly, anode heaters may be used to maintain the anodes at a safe temperature.

Selection of the best material for anodes has received considerable attention. Until about four years ago, steel was used almost universally for anodes in the commercial metal tank rectifier. The glass rectifier has used graphite anodes almost entirely. In the last few years it has been found that a special graphite anode used in the metal tank rectifier has been the means of materially improving the operation. Besides meeting the fundamental requirements, it does not deteriorate under high temperature in the vacuum tank and is not damaged by arc-back.



Assembly of graphite anode with a seal of vitreous insulation material, as used in a modern rectifier

The development of the 3,000-volt rectifier has led to an extensive investigation of the deionization of the vapor in the vicinity of the anode by means of plates or grids placed in front of them. A cylindrical insulated shield is placed around the anode. Inside of this shield and directly below the anode at a critical distance is inserted a grid or plate electrically connected to the anode shield. The shield and grid are energized from an auxiliary transformer so as to place them at a potential in the desired phase relation to the anode potential. The grid thus installed and excited acts to deionize the vapor in the vicinity of the anode each time the anode voltage decreases through zero before the anode voltage can reach a negative value sufficient to re-establish and produce an arc-back. The deionizing action of the grid has proved very successful in reducing this tendency.

The evacuating system is of extreme importance in the successful operation of the rectifier. As constituted in most modern rectifiers, the evacuating system includes a high vacuum or condensation pump which traps gases which may be liberated or leak into the tank and exhausts them into an intermediate chamber which in turn is exhausted by a motor-driven rotary oil-sealed pump, sometimes called the roughing pump. Originally, the evacuating system was made up of pumps which had been developed for laboratory use. These did not prove adequate for service. It was necessary to develop complete new evacuating systems with reliable roughing pumps and a much higher speed condensation pump in order to take care of any gas emission without interruption in the event of a short circuit or a serious overload. In the past, probably the most serious concern of operators has been arc-backs. These have been eliminated in modern rectifiers to the extent that they are no longer a problem in maintaining continuous service, and apparently they do not have any injurious effect on the rectifier. It is reasonable to expect ultimately the entire elimination of the arc-back.

Since with polyphase power supply, it is possible to transform from any number of phases to any other number, it is likewise possible to utilize any number of phases for impression on the rectifier that is desirable. As the number of phases is increased, the distortion of the current and voltage waves on the direct-current end of the rectifier is decreased. Hence there is a decided advantage in the use of the greatest possible number of phases consistent with economy in manufacture. It is the

Digitized by Google

usual practice to provide 6-phase or 12-phase connections. Three-phase operation produces wave forms which are not desirable and more than 12 phases involve complications in transformer design which usually are not justified.

The number of phases of the rectifier should not be confused with the number of anodes. To some extent the number of anodes determines the capacity of a unit. A certain type of anode construction will be capable of carrying a specified current. For example, a rectifier with six anodes may be capable of an output of 500 kw. By doubling the number of anodes of similar construction, and, of course, increasing the size of the tank in the proper proportion, an output of 1,000 kw. can be obtained.

In some instances the cooling system of the rectifier presents a difficult problem. As the rectifier is improved it is probable that other methods of cooling will appear. Another thing that would simplify rectifier construction and installation is the elimination of the evacuation system. Possibly future improvements will permit evacuating at the factory, sealing, shipping, installing and operating for an extended period without attention. These possible improvements in the rectifier would add materially to its already recognized advantages.

Many Large Rectifier Installations Made

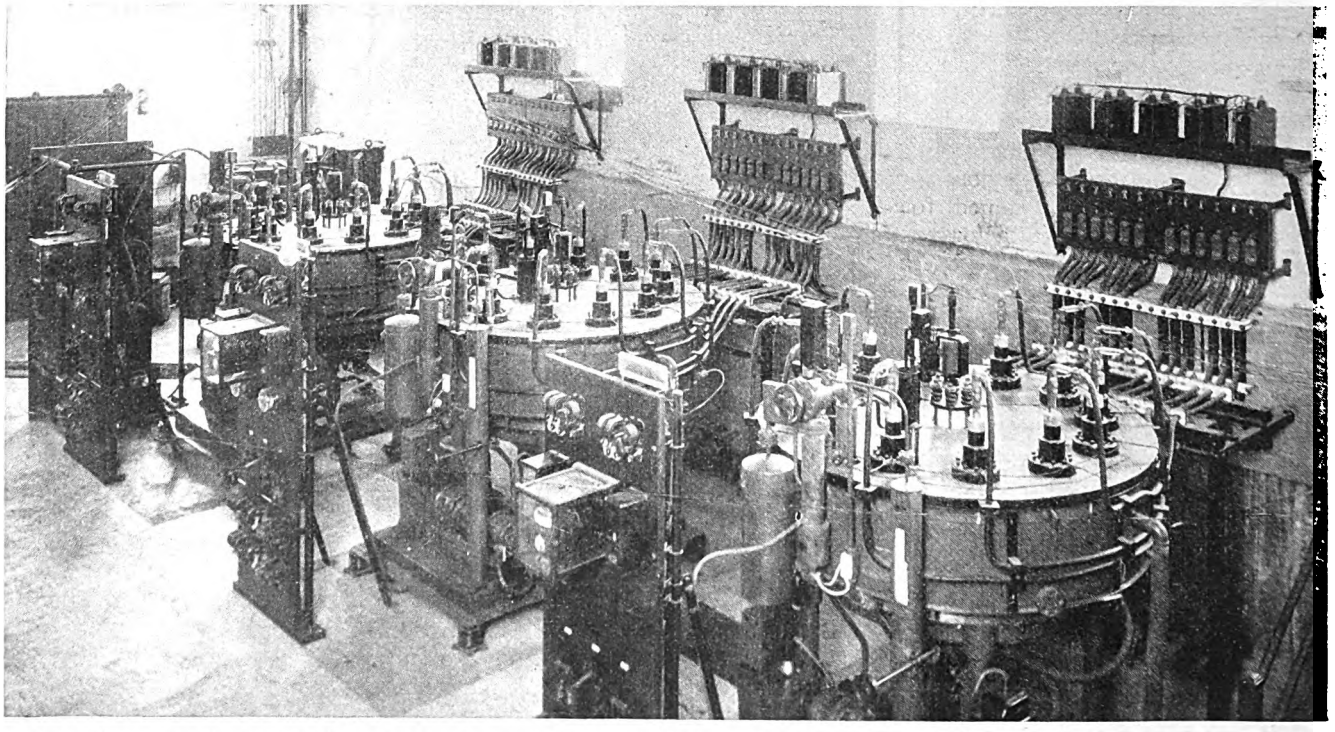
At the present time the General Electric Company has on order or in service approximately 115,000 kw. in rectifiers in the United States. The outstanding installation is that of the Delaware, Lackawanna & Western Railroad electrification extending from the Hoboken terminal to the suburban area served from it. This system will receive power for the trolley wire entirely from 3,000-volt rectifiers. The total installed capacity will be 37,000 kw. with a spare 3,000-kw. unit. The rectifier units are being built in sizes of 1,500 kw., 2,000 kw., and 3,000 kw. These ratings are nominal. In addition the units will be capable of delivering 300 per cent load for a period of five minutes, and of carrying momentary overloads in excess of this amount. Under the supervision of the consulting engineers, Jackson & Moreland, and the engineers of the railway, the sample rectifier for this installation has been subjected to what probably was the severest and most extensive series of duty cycles and short circuit tests ever put on any piece of electrical apparatus, in order to demonstrate its suitability for the service.

The flexibility of the rectifier is demonstrated in the recent installation of the Eastern Massachusetts Street Railway at Fall River. This installation consists of three 1,000-kw., 600-volt units with manual control. These units are arranged to operate from either of two power systems, one a 25-cycle, 13,200-volt and the other a 60-cycle, 22,860-volt circuit. The control equipment provides for instantaneous change from one source of supply to the other.

Within the next few months the Boston Elevated Railway will install a similar substation containing two 3,000-kw., 660-volt units with complete automatic and supervisory control. This substation also will be arranged for operation from either a 25-cycle or 60-cycle power circuit. The rectifier unit also can easily be arranged to supply two direct-current voltages by simple changeover methods.

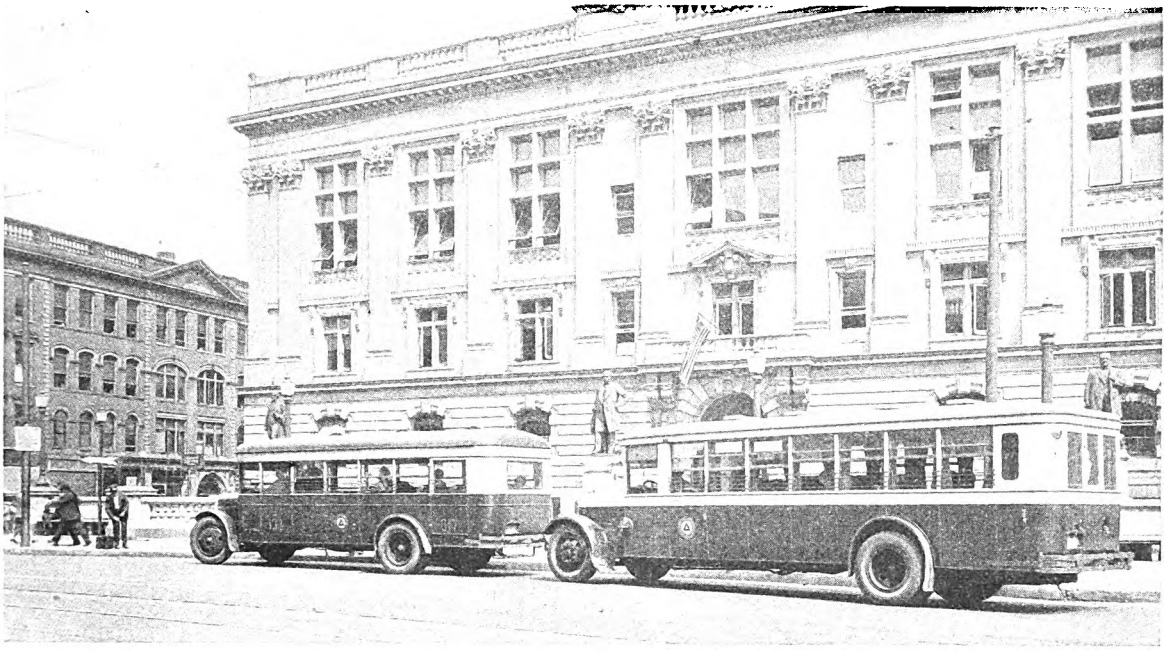
The New York Board of Transportation will install seven 3,000-kw., 600-volt rectifiers with complete automatic and supervisory control to supply power for the new Eighth Avenue subway in New York City. Rectifiers were selected for this installation, as they offered a means of solving the ventilation problem and are noiseless. The equipments will be installed in underground pockets along the subway lines.

Before the end of this year rectifiers will be in operation in every type of rail transportation service in the United States.



The three 1,000-kw., 600-volt rectifiers in the Fall River substation of the Eastern Massachusetts Street Railway are arranged for operation on either a 25-cycle or a 60-cycle supply

Digitized by Google



Bus station in front of Paterson City Hall. The tracks in the foreground are used by interurban car lines

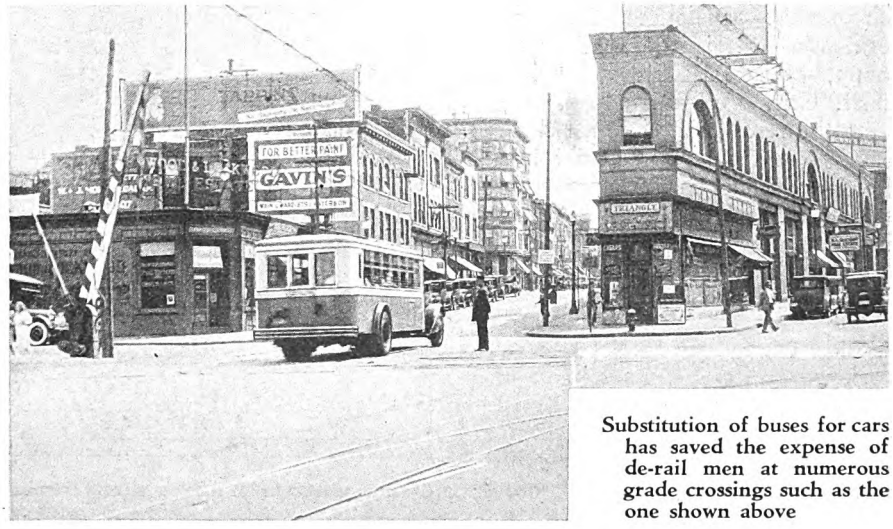
Buses Replace Cars

In Local Service at Paterson

Public Service Co-ordinated Transport has completed substitution begun several years ago. Narrow streets a handicap to rail operation. Three interurban car lines retained

SUBSTITUTION of buses in place of cars for local transportation in Paterson, N. J., has been completed by Public Service Co-ordinated Transport. The process has been gradual, extending over a period of several years. In all, nine street car lines have been discontinued and three retained. The latter are interurban lines connecting Paterson with Newark, Hoboken and Edgewater, the New Jersey terminal of the Hudson River ferry from 125th Street, New York City. About 30 miles of track have been abandoned on the local lines and 15 miles retained for the use of the interurban cars. Several factors were influential in shaping the company's policy of substituting bus service for car service on the local lines. One reason was the narrowness of many of the streets, which seriously hampered car operation. When the system was originally laid out most of the local lines were built as single track with turnouts. This made it difficult to adjust the headways according to the riding demands. Extra carrying capacity had to be provided by double-heading, and in some instances triple-heading certain scheduled trips instead of changing the schedule and shortening the headway. Moreover, vehicular traffic caused many delays on these narrow streets.

Another influential factor was the greater popularity of the buses with the public. This was due in large measure to certain conditions peculiar to Paterson. The



Substitution of buses for cars has saved the expense of de-rail men at numerous grade crossings such as the one shown above

Digitized by Google

Digitized by Google

Thus the railway lost traffic despite the introduction of Birney cars. As buses of larger capacity replaced the original vehicles, this loss was increased. During this period the development of the private automobile also took business away from the cars. This factor, however, was of less direct importance in Paterson than in many other cities, because the ratio of ownership to population is comparatively low.

Indirectly, the private automobile has added to the difficulties of car operation by creating extremely serious traffic congestion. During the busiest period of the day the average speed in trolleys in the business district dropped to less than 2 m.p.h. Despite the narrowness of the streets, parking regulations have been liberal. Under these difficult traffic conditions, the buses have been able to operate somewhat more satisfactorily than the cars.

In 1923, a law was passed in New Jersey requiring that in future all permits for buses to operate in territory already served by existing facilities must receive a certificate of convenience and necessity from the state Board of Public Utility Commissioners. This resulted in stabilizing the bus situation in Paterson. Soon afterward the Public Service began buying up buses which operated in direct competition with its cars, and co-ordinating the service. By this time there were more than 150 buses in operation in the city, and the number of cars on the local lines had been reduced to about half the former number.

The process of co-ordination resulted in further reduction in the car service. Gradually one line after another was entirely abandoned, until the last one was given up in the early part of 1929. The three interurban lines which remain do a certain amount of local business. Inasmuch as each of these lines is on a comparatively long headway, however, the part they play in the local transportation situation is relatively small.

Additional Territory Served

Besides their ability to operate more satisfactorily in narrow streets, and to make special mill trips, the buses have certain other advantages over the cars in Paterson. In the last few years the city has spread out somewhat, and new residential areas have sprung up beyond the ends of the local car lines. It has been a simple matter to extend the bus routes to serve these localities.

Due to the passage of the Erie and the New York, Susquehanna and Western Railroads through the heart of the city there are numerous grade crossings of the steam and electric lines. With one-man car operation it was necessary for Public Service to have de-rail men at these crossings. With bus operation this expense is eliminated, protection at the crossings being afforded by the regular flagmen of the steam railroads.

Grade separation was in process on the main line of the Erie through the city. While the effect of this project would have been to obviate the need for some of the de-rail men, it would also have involved the heavy expense of relocating the Public Service tracks had street car service been retained on the local lines. Moreover, a considerable portion of the street railway trackage in the city was showing signs of age and would soon have required reconstruction. This expense also has been saved by the substitution of buses for cars.

Operating figures for the present bus service and the former local car service cannot be compared satisfactorily. Originally all the buses were owned by individuals from whom reliable records are unobtainable. Even now there remains a sufficient number of individually owned buses in operation to render valueless any comparison of passengers carried, vehicle-miles, etc.

The advantages of the bus as a local transportation vehicle in Paterson can be stated only in general terms. Briefly summarized, they are:

1. Flexibility of schedule greater than on single-track car lines.
2. Ability to make special mill trips.
3. Increased speed through narrow streets.
4. Ability to serve districts beyond car lines.
5. Elimination of derail men at steam railroad crossings.
6. Saving in track reconstruction expense.

1835 Steel Poles Used for Chicago Trolley Bus System

Combination digger and pole setting machine cut installation costs materially

WHEN the Chicago Surface Lines received official order from the Illinois Commerce Commission on March 6, 1930, to operate trolley buses over seven routes within four months the company placed what is believed to be the largest order of tubular steel trolley poles placed by any street railway in ten years.

The order for 1,835 Elreco, three-section, tubular steel poles was placed on March 10, 1930, and specified delivery within 38 days. This amounted to almost 913 tons complete with extra heavy weight ground collars.

A pole-setting machine such as the one shown in the illustration greatly facilitated the installation of these poles. An average of 40 poles per day were set and concreted. This machine, manufactured by the Highway Trailer Company, and purchased for this particular installation, not only was more efficient than the line truck but assisted in cutting the cost of the pole setting considerably under the estimate.

Digitized by Google

1929 Was a Successful Year for the Electric Railways

Net income was increased on nearly all properties from which reports were received, and combined surplus was five times that for 1928. Traffic held up well, and with some increases in fares the gross revenues were greater. Higher schedule speeds, reduction of wastes and judicious extension of bus service all contributed to improved showing

By
EDMUND J. MURPHY
Director of Information Service
American Electric Railway Association

REPORTS for the year 1929 which have come to hand show that it was one of the most successful years the electric railways have had since the war. Almost without exception they had increases in net income, despite a small decrease in the number of passengers carried. A group of 202 such reports which have been combined and are analyzed in the accompanying tables show that after increasing depreciation allowances by $1,306,928, paying out $703,208 more in dividends and appropriating from net income $841,830 for other purposes, the surplus remaining was more than five times that of the previous year—$4,035,719 in 1929 against $805,423 in 1928.

Several factors were responsible for this improved showing. A higher average fare offset the small decrease in traffic; operating expenses were reduced, as were taxes and fixed charges. The latter change reflects financial and property reorganizations. While no bus figures are included in the above comparison, undoubtedly their use in replacing some unprofitable rail lines and in extending service where new track was not justified has had a favorable effect on the rail earnings.

The significance of the year's results lies in the demonstration that the industry can adjust itself to changed traffic conditions when they approach stabilization, as they did in 1929. Last year's electric railway traffic approximately equaled that of 1928, although nearly 2,000,000 more automobiles were in use. Measures which progressive companies took to adapt themselves to changed conditions produced gratifying increases in net. If such conditions can be maintained over a period of years the industry can undoubtedly be placed in a stronger position. As to the immediate outlook, the long-awaited saturation point of automobile production has not yet been reached; the problem of street traffic congestion gives no evidence of approaching solution. And until these two things are worked out the niche to be assigned in the future to the business of furnishing local transportation cannot be known.

The 202 companies whose reports form the basis of the above summary represent approximately 58 per cent

Table I—Combined Operations of 287 Electric Railway Companies and 166 Controlled Bus Undertakings*

	1929	1928	Increase or *Decrease*** Total	Per Cent
Operating revenue	$842,841,667	$833,369,839	$9,471,828	1.14
Operating expenses†	617,447,204	613,862,539	3,584,665	0.58
Net operating revenue	$225,394,463	$219,507,300	$5,887,163	2.68
Operating ratio, per cent	73.26	73.66	*0.40*	*0.54*
Miles of track and bus route[1]	37,072.60	35,924.22	1,148.38	3.20
Revenue passengers[2]	11,310,575,712	11,327,443,315	*16,867,603*	*0.15*
Total passengers[2]	14,263,856,398	14,272,056,435	*8,200,037*	*0.06*
Revenue car and bus-miles[3]	2,142,503,058	2,113,898,282	28,604,776	1.35
Total car and bus-miles[3]	2,154,011,466	2,125,723,398	28,288,068	1.33

*These preliminary tables include the reports of all companies received up to April 30, 1930. The income statement is not carried beyond "Net Operating Revenue" because many of the companies included are combination railway, light and power companies that do not make any segregation of their railway taxes or fixed charges.
**Decreases are indicated by *italic figures*.
†Includes depreciation to the extent that reporting companies included it in their operating expenses.
[1]Bus route, not round trip miles of route, represents miles of separate roads traversed; includes 155 bus undertakings.
[2]Includes 286 electric railways and 165 controlled bus undertakings.
[3]Includes 285 electric railways and 166 controlled bus undertakings.

Table II—Combined Operations of 286 Electric Railways

	1929	1928	Increase or *Decrease** Total	Per Cent
Railway operating revenue	$763,447,190	$761,456,330	$1,990,860	0.26
Railway operating expenses†	549,915,137	552,314,377	*2,399,240*	*0.43*
Net operating revenue	$213,532,053	$209,141,953	$4,390,100	2.10
Operating ratio, per cent	72.03	72.53	*0.50*	*0.69*
Miles of track	27,493.18	27,798.05	*304.87*	*1.10*
Revenue passengers[1]	10,251,489,410	10,324,025,007	*72,535,597*	*0.70*
Total passengers[1]	13,109,739,650	13,185,863,563	*76,123,913*	*0.58*
Revenue car-miles[2]	1,868,463,150	1,863,505,597	4,957,553	0.27
Total car-miles[2]	1,878,363,853	1,873,527,832	4,836,021	0.26

*Decreases are indicated by *italic figures*.
†Includes depreciation to the extent that reporting companies included it in their operating expenses.
[1]Reported by 285 companies [2]Reported by 284 companies.

Table III—Combined Operations of 165 Bus Undertakings Controlled by 286 Electric Railways

	1929	1928	Increase or *Decrease** Total	Per Cent
Bus operating revenue	$44,831,103	$37,902,383	$6,928,720	18.28
Bus operating expenses	41,828,968	35,985,255	5,843,713	16.24
Net operating revenue	$3,002,135	$1,917,128	$1,085,007	56.60
Operating ratio, per cent	93.30	94.94	*1.64*	*1.73*
Miles of bus route[1]	8,774.25	7,315.20	1,459.05	19.95
Revenue passengers[2]	438,884,768	378,473,695	60,411,073	15.96
Total passengers[2]	524,996,491	452,430,521	72,565,970	16.04
Revenue bus-miles	179,774,592	155,936,517	23,838,075	15.29
Total bus-miles	181,121,956	157,356,621	23,765,335	15.10

*Decreases are indicated by *italic figures*.
[1]Reported by 155 companies.
[2]Reported by 164 companies.

Digitized by Google

Part I—Combined Operating Reports of 202 Electric Railways For the Calendar Year 1929 Compared With 1928

Table IV—Combined Income Statement

Expenses	1929	1928	Increase or *Decrease** Total	Per Cent	Cents per Car-Mile[3] 1929	1928	Increase or *Decrease** Total	Per Cent
Railway operating revenue	$515,915,879	$517,100,517	*$1,184,638*	*0.23*	44.35	44.23	0.12	0.27
Railway operating expenses, excluding depreciation	355,952,412	361,835,743	*5,883,331*	*1.63*	30.60	30.95	*0.35*	*1.13*
Net operating revenue	$159,963,467	$155,264,774	$4,698,693	3.03	13.75	13.28	0.47	3.54
Net revenue, auxiliary operations	1,687,978	1,489,629	198,349	13.31	0.14	0.13	0.01	7.69
Taxes	31,452,256	31,896,802	*444,546*	*1.39*	2.70	2.73	*0.03*	*1.10*
Operating income	$130,199,189	$124,857,601	$5,341,588	4.28	11.19	10.68	0.51	4.77
Non-operating income	9,672,161	9,827,442	*155,281*	*1.58*	0.83	0.84	*0.01*	*1.19*
Gross income	$139,871,350	$134,685,043	$5,186,307	3.85	12.02	11.52	0.50	4.34
Deductions from gross income	83,667,246	84,563,201	*895,955*	*1.06*	7.19	7.23	*0.04*	*0.55*
Net income (before depreciation)	$56,204,104	$50,121,842	$6,082,262	12.13	4.83	4.29	0.54	12.59
Depreciation	31,979,198	30,672,270	1,306,928	4.26	2.75	2.62	0.13	4.96
Dividends	14,646,206[1]	13,942,998[2]	703,208	5.04	.....	.....	.....	.....
Other appropriations	5,542,981	4,701,151	841,830	17.91	.....	.....	.....	.....
Surplus	$4,035,719	$805,423	$3,230,296	401.07	.....	.....	.....	.....
Operating ratio, per cent	68.99	69.97	*0.98*	*1.40*	.....	.....	.....	.....
Ratio, net income to operating revenue, per cent	10.89	9.69	1.20	12.38	.....	.....	.....	.....

†The 202 companies included in Table IV and subsequent tables either operate railways only or if they do a joint railway, power and light business make a complete separation of their railway taxes and charges. Complete information on these companies, therefore, is given.

*Decreases are indicated by *italic figures*.
[1]Reported by 37 companies. [2]Reported by 36 companies.
[3]Based on 200 companies.

Table V—Operating Expenses by Primary Accounts (202 Companies)

Expenses	1929	1928	Increase or *Decrease** Total	Per Cent	Cents per Car-Mile[3] 1929	1928	Increase or *Decrease** Total	Per Cent
Way and structures, excluding depreciation	$40,973,814	$41,674,599	*$700,785*	*1.68*	3.52	3.56	*0.04*	*1.12*
Equipment, excluding depreciation	38,627,979	40,113,962	*1,485,983*	*3.70*	3.32	3.43	*0.11*	*3.21*
Power, excluding depreciation	48,566,137	48,839,836	*273,699*	*0.56*	4.18	4.18	.....	.....
Conducting transportation	167,263,361	170,097,764	*2,834,403*	*1.67*	14.38	14.55	*0.17*	*1.17*
Traffic	2,328,758	2,377,459	*48,701*	*2.05*	0.20	0.20	.....	.....
General and miscellaneous	58,194,118	58,825,676	*631,558*	*1.07*	5.00	5.03	*0.03*	*0.60*
Transportation for investment—credit	—264,224	—261,433	2,791	1.07	—0.02	—0.02	.....	.....
Total operating expenses, excluding depreciation	$355,952,412[1]	$361,835,743[2]	*$5,883,331*	*1.63*	30.60[4]	30.95[5]	*0.35*	*1.13*
Depreciation								
Way and structures	$9,015,079	$9,858,548	*$843,469*	*8.56*	0.77	0.84	*0.07*	*8.33*
Equipment	9,379,603	8,404,066	975,537	11.61	0.81	0.72	0.90	12.50
Power	1,965,250	2,048,446	*83,196*	*4.06*	0.17	0.18	*0.01*	*5.56*
Undistributed depreciation reported in operating expenses	3,156,146	2,134,550	1,021,596	47.86	0.27	0.18	0.09	50.00
Total depreciation reported in operating expenses	$23,516,078	$22,445,610	$1,070,468	4.77	2.02	1.92	0.10	5.21
Depreciation reported as a deduction from net income	8,463,120	8,226,660	236,460	2.87	0.73	0.70	0.03	4.28
Total depreciation	$31,979,198	$30,672,270	$1,306,928	4.26	2.75	2.62	0.13	4.96

*Decreases are indicated by *italic figures*. [1]Includes $262,469 undistributed expense. [2]Includes $167,880 undistributed expense. [3]Based on 200 companies.
[4]Includes 0.02 cent undistributed expense. [5]Includes 0.01 cent undistributed expense.

of the electric railway business in the United States. Reports also were received from 84 other companies, but since these combined light and power with railway operations, or for other reasons, the statements could not be included with the complete reports of the main group. The data on railway operating revenues and expenses, car-miles and passengers carried by these 84 companies have been combined with the similar items of the all-rail group to form Table II. The latter table represents about 85 per cent of the entire industry. It serves as a check on the more detailed data prepared for the 202 companies, and shows that it is representative. From his knowledge of the companies involved, the writer believes that the tables of the main group are more

Table VI—Operating Statistics

(202 Companies)

	1929	1928	Increase or *Decrease** Total	Per Cent
Passenger car-miles	1,123,692,836	1,130,440,603	*6,747,767*	*0.60*
Revenue car-miles[1]	1,155,800,883	1,161,535,792	*5,734,909*	*0.49*
Total car-miles[1]	1,162,604,865	1,168,362,902	*5,758,037*	*0.49*
Revenue passengers[2]	6,362,672,831	6,494,155,833	*131,483,002*	*2.02*
Transfer passengers				
Revenue	306,834,139	310,938,709	*4,104,570*	*1.32*
Free[2]	1,533,031,670	1,528,070,959	4,960,711	0.32
Total passengers*	8,253,391,568	8,385,464,074	*132,072,506*	*1.58*
Passenger revenue	$482,328,131	$483,890,806	*$1,562,675*	*0.32*
Passenger car-hours[5]	102,743,137	104,231,069	*1,487,932*	*1.43*
Revenue car-hours[5]	103,954,471	105,551,643	*1,597,172*	*1.51*
Total car-hours	104,511,893	106,125,358	*1,613,465*	*1.52*
Miles of single track	20,255.45	20,436.26	*180.81*	*0.88*
Passenger cars operated[6]	24,301	24,674	*373*	*1.51*

*Decreases are indicated by *italic figures*.
[1]Reported by 200 companies.
[2]Reported by 201 companies.
[3]Reported by 31 companies.
[4]Reported by 136 companies.
[5]Reported by 181 companies.
[6]Average maximum number of passenger cars in service daily, reported by 164 companies.

Table VII—Significant Ratios Derived from Tables IV-VI

(202 Companies)

	1929	1928	Increase or *Decrease** Per Cent
Railway operating revenue			
Per mile of single track	25,470	25,303	0.07
Gross income			
Per mile of single track	6,905	6,590	4.78
Passenger revenue			
Per revenue passenger, cents[4]	7.55	7.42	1.75
Per total passenger, cents[1]	5.82	5.75	1.22
Per mile of single track	$23,812	$23,678	0.57
Per passenger car-mile, cents[2]	42.91	42.79	0.28
Per car operated[3]	$16,246	$16,126	0.74
Per passenger car-hour, cents[4]	$4.08	$4.05	0.74
Revenue passengers			
Per mile of single track[1]	315,631	319,355	*1.17*
Per passenger car-mile[5]	5.68	5.77	*1.56*
Per car operated[3]	206,148	207,131	*0.47*
Per passenger car-hour[6]	56	56	....
Total passengers			
Per mile of single track[1]	409,424	412,361	*0.71*
Per passenger car-mile[5]	7.37	7.45	*1.07*
Ratio, transfer passengers to revenue passengers, per cent[7]	31.01	30.43	1.91
Revenue car-miles			
Per mile of single track[2]	57,261	57,007	0.45
Per car operated[8]	39,835	39,202	1.61
Per car-hour[4]	9.47	9.39	0.85
Car-hours			
Per car operated[9]	4,030	4,036	*0.16*

*Decreases are indicated by *italic figures*.
[1]Reported by 201 companies
[2]Reported by 200 companies
[3]Reported by 164 companies
[4]Reported by 181 companies
[5]Reported by 199 companies.
[6]Reported by 180 companies.
[7]Reported by 147 companies.
[8]Reported by 163 companies.
[9]Reported by 151 companies.

Digitized by Google

Table VIII—Operating Statement

	City Lines, 114 Companies				Interurban Lines, 34 Companies				Combined City and Interurban Lines, 54 Companies			
			Increase or *Decrease**				Increase or *Decrease**				Increase or *Decrease**	
	1929	1928	Total	Per Cent	1929	1928	Total	Per Cent	1929	1928	Total	Per Cent
Railway operating revenue	$394,698,573	$392,867,931	$1,830,642	0.47	$19,630,345	$20,045,576	*$415,231*	*2.07*	$101,586,961	$104,187,010	*$2,600,049*	*2.50*
Ry. oper. expen. (excl. deprec.)	266,485,800	269,581,154	*3,095,354*	*1.15*	14,973,177	15,550,398	*577,221*	*3.71*	74,493,434	76,704,190	*2,210,756*	*2.88*
Net operating revenue	$128,212,773	$123,286,777	$4,925,996	4.00	$4,657,168	$4,495,178	$161,990	3.60	$27,093,527	$27,482,820	*$389,293*	*1.42*
Net revenue, auxiliary oper.	559,235	516,682	42,553	8.24	289,305	147,471	141,834	96.18	839,438	825,476	13,962	1.69
Taxes	24,990,599	25,133,066	142,467	0.57	1,036,999	1,009,482	27,517	2.73	5,424,659	5,754,255	*329,596*	*5.73*
Operating income	$103,781,409	$98,670,393	$5,111,016	5.18	$3,909,474	$3,633,167	$276,307	7.61	$22,508,306	$22,554,041	*$45,735*	*0.20*
Non-operating income	6,604,669	7,012,403	*407,734*	*5.81*	300,069	345,839	*45,770*	*13.23*	2,767,423	2,469,200	298,223	12.08
Gross income	$110,386,078	$105,682,796	$4,703,282	4.45	$4,209,543	$3,979,006	$230,537	5.79	$25,275,729	$25,023,241	$252,488	1.01
Deductions from gross income	61,576,594	61,872,541	*295,947*	*0.48*	5,473,383	5,795,350	*321,967*	*5.56*	16,617,269	16,895,310	*278,041*	*1.65*
Net income (before deprec.)	$48,809,484	$43,810,255	$4,999,229	11.41	—$1,263,840	—$1,816,344	$552,504	....	$8,658,460	$8,127,931	$530,529	6.53
Depreciation	23,729,285	22,721,083	1,008,204	4.44	1,152,672	1,086,216	66,456	6.12	7,097,241	6,864,971	232,270	3.38
Dividends	[1]11,260,032	[1]10,975,668	284,364	2.59	[2]460,010	[3]197,373	262,637	133.07	[4]2,926,164	[4]2,769,957	156,207	5.64
Other appropriations	5,337,198	4,435,940	901,258	20.32	99,602	187,980	*88,378*	*47.01*	106,181	77,231	28,950	37.48
Surplus	$8,482,969	$5,677,564	$2,805,405	49.41	—$2,976,124	—$3,287,913	$311,789	....	—$1,471,126	—$1,584,228	*$113,102*	....
Operating ratio, per cent	67.52	68.62	*1.10*	*1.60*	76.27	77.57	*1.30*	*1.68*	73.33	73.62	*0.29*	*0.39*
Ratio, net income to operating revenue, per cent	12.37	11.15	1.22	11.09	.....	.....	.....	....	8.52	7.80	0.72	9.23

*Decreases are indicated by *italic figures*. Deficits are indicated by minus signs. [1]Reported by 25 companies. [2]Rep orted by 4 companies. [3]Reported by 3 companies [4] Reported by 8 companies.

Table IX—Operating Expenses by Primary Accounts

Expenses	City Lines, 114 Companies				Interurban Lines, 34 Companies				Combined City and Interurban Lines, 54 Companies			
			Increase or *Decrease**				Increase or *Decrease**				Increase or *Decrease**	
	1929	1928	Total	Per Cent	1929	1928	Total	Per Cent	1929	1928	Total	Per Cent
Way and struc., excl. deprec.	$27,661,678	$27,729,703	*$68,025*	*0.25*	$2,383,144	$2,457,644	*$74,500*	*3.03*	$10,928,991	$11,487,251	*$558,260*	*4.86*
Equipment, excluding deprec.	29,564,411	30,828,691	*1,264,280*	*4.10*	1,288,229	1,442,218	*153,989*	*10.68*	7,775,339	7,843,053	*67,714*	*0.86*
Power, excluding depreciation	35,579,502	35,356,518	222,984	0.63	2,236,136	2,392,734	*156,598*	*6.54*	10,750,499	11,090,584	*340,085*	*3.07*
Conducting transportation	[1]31,776,545	133,234,820	*1,458,275*	*1.09*	5,185,718	5,293,621	*107,903*	*2.04*	30,301,098	31,569,323	*1,268,225*	*4.02*
Traffic	1,034,756	1,096,893	*62,137*	*5.67*	380,155	361,058	19,097	5.29	913,847	919,508	*5,661*	*0.62*
General and miscellaneous	40,770,161	41,304,379	*534,218*	*1.29*	3,544,127	3,658,349	*114,222*	*3.12*	13,879,830	13,862,948	16,882	0.12
Transp. for investment—credit	—138,879	—105,115	33,764	32.12	—44,332	—55,226	*10,894*	*19.73*	—81,013	—101,092	*20,079*	*19.86*
Total opera. exp. excl. depr.	[1]$266,485,800	[2]$269,581,154	*$3,095,354*	*1.15*	$14,973,177	$15,550,398	*$577,221*	*3.71*	[3]$74,493,434	[4]$76,704,190	*$2,210,756*	*2.88*
Depreciation												
Way and structures	$6,210,596	$7,142,270	*$931,674*	*13.05*	$330,579	$331,779	*$1,200*	*0.36*	$2,473,904	$2,384,499	$89,405	3.75
Equipment	6,089,529	5,285,624	803,905	15.21	610,097	525,228	84,869	16.16	2,679,977	2,593,214	86,763	3.34
Power	1,067,241	1,157,836	*90,595*	*7.82*	23,397	36,184	*12,787*	*35.34*	874,612	854,426	20,186	2.36
Undistr. deprec. reported in operating expenses	3,153,373	2,131,586	1,021,787	47.94	.....	.....	.....	.....	2,773	2,964	*191*	*6.44*
Total depreciation reported in operating expenses	$16,520,739	$15,717,316	$803,423	5.11	$964,073	$893,191	$70,882	7.94	$6,031,266	$5,835,103	$196,163	3.36
Depreciation reported as a deduction from net income	7,208,546	7,003,767	204,779	2.92	188,599	193,025	*4,426*	*2.29*	1,065,975	1,029,868	36,107	3.50
Total depreciation	$23,729,285	$22,721,083	$1,008,204	4.44	$1,152,672	$1,086,216	$66,456	6.12	$7,097,241	$6,864,971	$232,270	3.38

Decreases are indicated by *italic figures*. [1]Includes $237,626 undistributed expense. [2]Includes $135,265 undistributed expense. [3]Includes $24,843 undistributed expense. [4]Includes $32,615 undistributed expense.

Table X—Operating Statistics

	City Lines, 114 Companies				Interurban Lines, 34 Companies				Combined City and Interurban Lines, 54 Companies			
			Increase or *Decrease**				Increase or *Decrease**				Increase or *Decrease**	
	1929	1928	Total	Per Cent	1929	1928	Total	Per Cent	1929	1928	Total	Per Cent
Passenger car-miles	877,896,628	878,745,808	*849,180*	*0.10*	[4]32,032,510	[4]33,804,632	*1,772,122*	*5.24*	213,763,698	217,890,163	*4,126,465*	*1.89*
Revenue car-miles	879,294,628	880,344,886	*1,050,258*	*0.12*	[4]41,926,762	[4]42,819,792	*893,030*	*2.09*	234,579,493	238,371,114	*3,791,621*	*1.59*
Total car-miles	882,894,128	884,186,655	*1,292,527*	*0.15*	[4]42,795,852	[4]43,697,503	*901,651*	*2.06*	236,914,885	240,478,744	*3,563,859*	*1.48*
Revenue passengers	5,379,592,986	5,473,451,737	*93,858,751*	*1.71*	[5]46,786,349	[5]48,374,703	*1,588,354*	*3.28*	936,293,496	972,329,393	*36,035,897*	*3.71*
Transfer pass., revenue	[1]291,708,767	[1]294,570,149	*2,861,382*	*0.97*	[6]75,413	[6]88,007	*12,594*	*14.31*	[9]15,049,959	[9]16,280,553	*1,230,594*	*7.56*
Transfer pass., free	[2]1,400,506,277	[2]1,392,916,545	7,589,732	0.54	7543,268	7614,015	*70,747*	*11.52*	[10]131,982,125	[10]134,540,399	*2,558,274*	*1.90*
Total passengers	7,105,415,797	7,196,531,465	*91,115,668*	*1.27*	48,345,886	50,039,791	*1,693,905*	*3.39*	[10]1,099,629,885	1,138,892,818	*39,262,933*	*3.45*
Passenger revenue	$384,263,969	$382,238,538	$2,025,431	0.53	$12,723,590	$13,224,846	*$501,256*	*3.79*	$85,340,572	$88,427,422	*$3,086,850*	*3.49*
Passenger car-hours	[3]83,602,721	[3]84,572,206	*969,485*	*1.15*	[8]1,384,670	[8]1,472,849	*88,179*	*5.99*	[11]17,755,746	[11]18,186,014	*430,268*	*2.37*
Revenue car-hours	[3]83,704,246	[3]84,716,371	*1,012,125*	*1.19*	[8]2,025,789	[8]2,215,532	*189,743*	*8.56*	[11]18,224,436	[11]18,619,740	*395,304*	*2.12*
Total car-hours	[3]84,092,953	[3]85,138,783	*1,045,830*	*1.23*	[8]2,053,390	[8]2,244,486	*191,096*	*8.51*	[11]18,365,550	[11]18,742,089	*376,539*	*2.01*
Miles, single track	10,852.20	10,971.05	*118.85*	*1.08*	2,196.45	2,209.66	*13.21*	*0.60*	7,206.80	7,255.55	*48.75*	*0.67*
Passenger cars operated	[12]19,372	19,693	*321*	*1.63*	[13]457	[13]463	*6*	*1.30*	[14]4,472	[14]5,518	*46*	*1.02*

*Decreases are indicated by *italic figures*.

[1]Reported by 20 companies.
[2]Reported by 90 companies.
[3]Reported by 107 companies.
[4]Reported by 32 companies.
[5]Reported by 33 companies.
[6]Reported by 2 companies.
[7]Reported by 8 companies.
[8]Reported by 24 companies.
[9]Reported by 9 companies.
[10]Reported by 38 companies.
[11]Reported by 50 companies.
[12]Average maximum number of passenger cars in service daily. Reported by 99 companies.
[13]Average maximum number of passenger cars in service daily. Reported by 22 companies.
[14]Average maximum number of passenger cars in service daily. Reported by 43 companies.

nearly representative of the industry as a whole than those including the 286 companies.

The total operating revenues of the larger group, as shown in Table II, were $763,447,190 last year, and 0.26 per cent above 1928, while the smaller group took in $515,915,879, a decrease of 0.23 per cent. The smaller decrease in the operating expenses of the larger group shown in Table II, 0.43 per cent, as compared with a decrease of 1.63 per cent for the smaller group in Table IV, is accounted for largely by the inclusion of depreciation in the former, while it has been taken out of the latter. As shown in Table IV, the amounts charged off last year were 4.26 per cent greater than in the year previous. To make the results comparable, all depreciation was taken out of operating expenses and added to that appropriated from net income. In Table II the depreciation is shown as it was charged in the original reports.

Digitized by Google

There was a decrease of 0.58 per cent in the number of passengers carried by the companies grouped in Table II, while car-miles increased 0.26 per cent. The smaller groups of Table IV operated 0.49 per cent less car-miles and carried 1.58 per cent fewer passengers than in 1928. In both groups, however, the proportionate amount of service rendered with respect to the traffic increased last year.

Of the 286 companies included in Table II, 165 carried on auxiliary bus operations. The operating revenue from this source increased 18.28 per cent from the previous year, while the net operating revenue increased 56.60 per cent. Not all this increase was due to a mere extension of service. Despite continued expansion of their bus service in 1929 these companies were able to increase the margin between operating expenses and revenues, as is shown by the drop in the operating ratio from 94.94 to 93.30 per cent. The number of bus passengers increased 16.04 per cent, while the service in bus-miles only went up 15.10 per cent.

More detailed analysis of the 202 companies is made in the succeeding tables. When the combined figures are broken down into separate statements for city companies, interurban companies, and those operating both city and interurban lines it at once becomes apparent that the city companies made by far the best showing. They not only contributed all the surplus shown in the combined statement, but more than

Table XI—Income Statements of All Three Types of Companies in Cents per Car-Mile

	City Lines 114 Companies			Interurban Lines 32 Companies[1]			Combination Lines 54 Companies		
	1929	1928	Increase or *Decrease* Per Cent*	1929	1928	Increase or *Decrease* Per Cent*	1929	1928	Increase or *Decrease* Per Cent*
Railway operating revenue	44.70	44.43	0.61	45.23	45.24	*0.02*	42.88	43.32	*1.02*
Railway operating expenses (excl. depreciation)	30.18	30.49	*1.02*	34.52	35.15	*1.79*	31.44	31.89	*1.41*
Net operating revenue	14.52	13.94	4.16	10.71	10.09	6.14	11.44	11.43	0.09
Net revenue, auxiliary operations	0.06	0.06	.....	0.68	0.33	106.06	0.35	0.34	2.94
Taxes	2.83	2.84	*0.35*	2.39	2.27	5.29	2.29	2.39	*4.18*
Operating income	11.75	11.16	5.29	9.00	8.15	10.43	9.50	9.38	1.28
Non-operating income	0.75	0.79	*5.06*	0.69	0.78	*11.54*	1.16	1.03	12.62
Gross income	12.50	11.95	4.60	9.69	8.93	8.51	10.66	10.41	2.40
Deductions from gross income	6.97	7.00	*0.43*	12.57	13.05	*3.68*	7.01	7.03	*0.28*
Net income (before depreciation)	5.53	4.95	11.72	—2.88	—4.12	.....	3.65	3.38	7.99
Depreciation	2.69	2.57	4.67	2.65	2.44	8.61	2.99	2.85	4.91

*Decreases are indicated by *italic figures*. Minus sign indicates deficit.
[1]Two of the 34 companies included in Table VIII did not report car-miles operated.

Table XII—Operating Expenses in Cents per Car-Mile

	City Lines 114 Companies			Interurban Lines 32 Companies[3]			Combination Lines 54 Companies		
Expenses	1929	1928	Increase or *Decrease* Per Cent*	1929	1928	Increase or *Decrease* Per Cent*	1929	1928	Increase or *Decrease* Per Cent*
Way and structures, excluding depreciation	3.13	31.4	*0.32*	5.46	5.51	*0.91*	4.61	4.78	*3.56*
Equipment, excluding depreciation	3.35	3.49	*4.01*	2.97	3.26	*8.90*	3.28	3.26	0.61
Power, excluding depreciation	4.03	4.00	0.75	5.17	5.42	*4.61*	4.54	4.61	*1.52*
Conducting transportation	14.93	15.07	*0.93*	11.98	11.98	.....	12.79	13.13	*2.59*
Traffic	0.12	0.12	.....	0.88	0.82	7.32	0.38	0.38	.....
General and miscellaneous	4.62	4.67	*1.07*	8.16	8.28	*1.45*	5.86	5.76	1.74
Transportation for investment—credit	—0.02	—0.01	100.00	—0.10	—0.12	*16.67*	—0.03	—0.04	*25.00*
Total operating expenses, excluding depreciation	30.18[1]	30.49[2]	*1.02*	34.52	35.15	*1.79*	31.44[2]	31.89[2]	*1.41*
Depreciation									
Way and structures	0.70	0.81	*13.58*	0.77	0.75	2.67	1.04	0.99	5.05
Equipment	0.69	0.60	15.00	1.39	1.17	18.80	1.13	1.07	5.61
Power	0.12	0.13	*7.69*	0.05	0.08	*37.50*	0.37	0.36	2.78
Undistributed depreciation reported in operating expenses	0.36	0.24	50.00	.....	.....	.....	.....	.....	.....
Total depreciation reported in operating expenses	1.87	1.78	5.06	2.21	2.00	10.50	2.54	2.42	4.96
Depreciation reported as a deduction from net income	0.82	0.79	3.80	0.44	0.44	.....	0.45	0.43	4.65
Total depreciation	2.69	2.57	4.67	2.65	2.44	8.61	2.99	2.85	4.91

*Decreases are indicated by *italic figures*. Minus sign indicates deficit.
[1]Includes 0.02 cents undistributed expense.
[2]Includes 0.01 cent undistributed expense.
[3]Two of the 34 companies included in Table IX did not report car-miles operated.

Table XIII—Significant Ratios Derived from Tables VIII-X

	City Lines, 114 Companies		Increase or *Decrease*,	Interurban Lines, 34 Companies		Increase or *Decrease*,	Combination Lines, 54 Companies		Increase or *Decrease*,
	1929	1928	Per Cent*	1929	1928	Per Cent*	1929	1928	Per Cent*
Railway operating revenue per mile of single track	$36,370	$35,810	1.56	$8,937	$9,072	*1.49*	$14,096	$14,360	*1.84*
Gross income per mile of single track	$10,172	$9,633	5.60	$1,917	$1,801	6.44	$3,507	$3,449	1.68
Passenger revenue per revenue passenger, cents	7.14	6.98	2.29	[5]23.31	[5]23.59	*1.19*	9.11	9.09	0.22
Per total passenger, cents	5.41	5.31	1.88	[5]22.56	[5]22.81	*1.10*	7.76	7.76	.....
Per mile of single track	$35,409	$34,841	1.63[7]	$5,793	$5,985	*3.21*	$11,842	$12,188	*2.84*
Per passenger car-mile, cents	43.77	43.50	0.62	[6]39.31	[6]38.68	1.63	39.92	40.75	*2.04*
Per car operated	[1]$15,886	[1]$15,631	1.63	[7]$24,762	[7]$25,260	*1.97*	[14]$16,936	[14]$17,347	*2.37*
Per passenger car-hour	[2]$4.11	[2]$4.05	1.48	[8]$6.06	[8]$6.11	*0.82*	[15]$3.79	[15]$3.87	*2.07*
Revenue passengers per mile of single track	495,715	498,900	*0.64*	[5]22,284	[5]22,939	*2.86*	129,918	134,016	*3.06*
Per passenger car-mile	6.13	6.23	*1.61*	[9]1.68	[9]1.64	2.44	4.38	4.46	*1.79*
Per car operated	[1]213,989	[1]214,012	*0.01*	[7]87,657	[7]87,023	0.73	[14]184,158	[14]189,448	*2.79*
Per passenger car-hour	[2]60	[2]59	1.69	[10]36	[10]35	2.86	[15]46	[15]47	*2.13*
Total passengers per mile of single track	654,744	655,956	*0.18*	[5]23,027	[5]24,786	*7.10*	152,582	156,973	*2.80*
Per passenger car-mile	8.09	8.19	*1.22*	[9]1.74	[9]1.69	2.96	5.14	5.23	*1.72*
Ratio, transfer passengers to revenue passengers, per cent	[3]33.02	[3]32.41	1.88	[11]5.08	[11]5.53	*8.14*	[14]18.47	[14]18.33	0.76
Revenue car miles per mile of single track	81,025	80,243	0.97	[6]19,723	[6]19,925	*1.01*	32,550	32,855	*0.93*
Per car operated	[1]37,027	[1]36,183	2.33	[12]92,633	[12]93,115	*0.52*	[14]46,666	[14]46,893	*0.48*
Per car-hour	29.28	29.18	1.09	[8]12.53	[8]12.29	1.95	[15]10.03	[15]10.01	0.20
Revenue car-hours per car operated	[4]3,919	[4]3,925	*0.15*	[13]5,739	[13]6,045	*5.06*	[16]4,418	[16]4,389	0.66

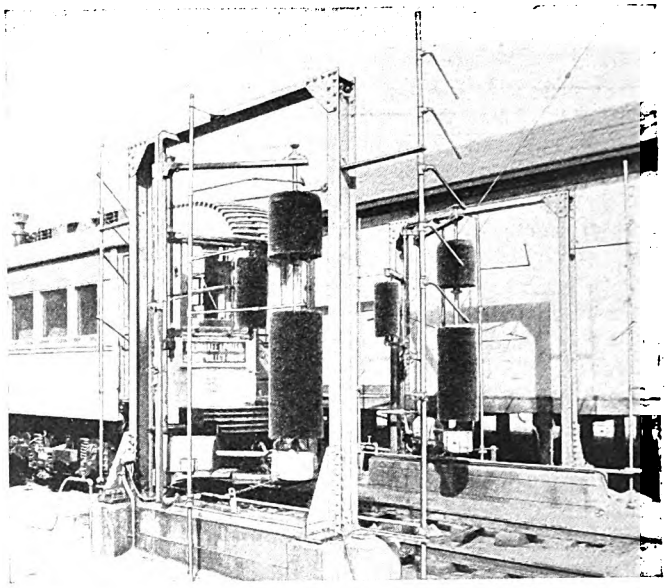
*Decreases are indicated by *italic figures*.
[1]Reported by 99 companies.
[2]Reported by 107 companies.
[3]Reported by 96 companies.
[4]Reported by 93 companies.
[5]Reported by 33 companies.
[6]Reported by 32 companies.
[7]Reported by 22 companies.
[8]Reported by 24 companies.
[9]Reported by 31 companies.
[10]Reported by 23 companies.
[11]Reported by 8 companies.
[12]Reported by 21 companies.
[13]Reported by 19 companies.
[14]Reported by 43 companies.
[15]Reported by 50 companies.
[16]Reported by 39 companies.

Digitized by Google

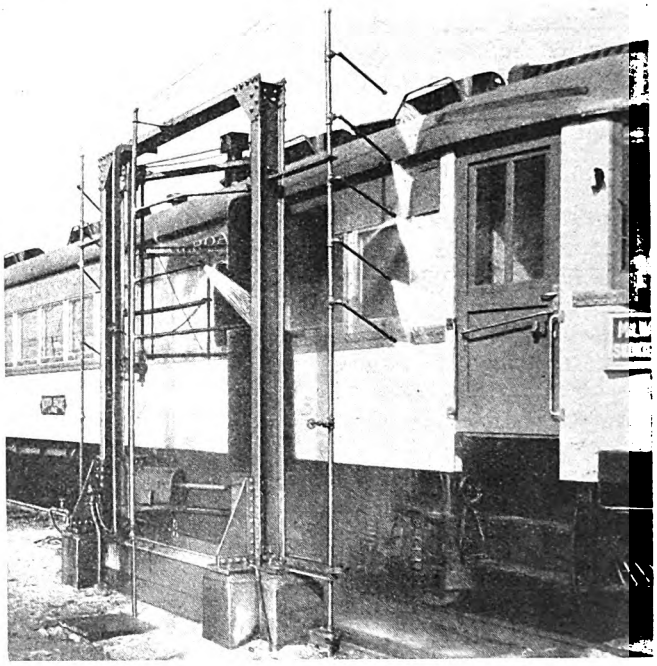
overcame the deficits of the other two groups. However, the deficits of the interurban and combination groups were substantially lower than in 1928, so that these companies contributed their share of the larger increase of 401 per cent in the combined surplus of the three groups.

Since the volume of city operations was so great that they completely outweighed those of the other two groups, it is to them that we must look for the trends which established the character of the results attained by the industry in 1929. Probably the most interesting thing brought out by the analysis of the city company results was the methods by which operating expenses were reduced. This was the largest single factor in producing the increase in net earnings. The principal source of the lower operating expenses was the increase in the average speed, despite the increasing congestion on the city streets. As shown in Table XIII, the average speed of the city companies increased from 9.18 m.p.h. in 1928 to 9.28 m.p.h. in 1929. The effect of this was that the car-hours were reduced 1.19 per cent while the car-miles were reduced only 0.12 per cent. In Table IX it is seen that the cost of conducting transportation, of which the principal factor is wages of trainmen, was reduced 1.09 per cent. The difference between this figure and the per cent reduction in car-hours is due to the higher average wages in 1929.

While the total passenger revenue of the city companies increased only 0.53 per cent, the passenger revenue per mile of single track increased 1.63 per cent, as is indicated in Table XIII. This is the result of abandonment of unprofitable track. It is probable that only a small proportion of these companies abandoned any track. If, then, the effect of these abandonments is sufficient to affect the average for the whole group it is reasonable to conclude that the effect on the individual companies concerned must have been much more favorable. The industry undoubtedly has many more miles of track which are no longer contributing adequately to the success of the system. As this mileage is gradually weeded out, with or without the substitution of bus service, the effect on the earning power of the balance of the trackage cannot be other than healthful and salutary.



These high-speed rotating brushes can be adjusted laterally and vertically



Both sides of a car are washed simultaneously in approximately four minutes by this machine used by the North Shore Line

Car Washing Speed Doubled

ROTATING vertical brushes and a high-pressure spray are the essential features of a new car-washing device designed by Henry Cordell, master mechanic, Chicago, North Shore & Milwaukee Railroad. The brushes are so arranged that a car passes slowly between them while they are rotating at a speed of 200 r.p.m. Irregularities in width or height of cars are compensated for by vertical or lateral adjustments. The spray of water reaches the car at a pressure of 350 lb. One spray is located ahead of the rotating brushes, another between them and the third behind the brushes. A single passage through the washing machine is sufficient for a thorough cleaning. Both sides of the car are washed simultaneously in approximately four minutes. The ends of the car are washed by hand, the entire operation on one car requiring about ten minutes. During an eight-hour day, 48 cars can be washed by a crew of three men, including a motorman to pilot the cars through the washer and return them to the storage tracks. The best speed obtained by the old hand method of washing cars with fountain brushes was one car an hour per man. The new method has doubled the output of clean cars per man per day. In addition to this economy in operation, the new machine does a much more satisfactory job. Approximately 50 gal. of water are used in washing each car.

Empty Taxis Add to Traffic Congestion

TRAFFIC counts recently made on Fifth Avenue, New York City, showed that 51 per cent of all vehicles using that street were taxicabs. One third of the taxis, or 17 per cent of the total number of vehicles, were empty. It is noteworthy that this condition exists in spite of the endeavor of the Police Department to divert empty taxis to streets other than Fifth Avenue.

Digitized by Google

Investigation has brought to light many opportunities for savings by the adoption of simplified practice. Electric railways have been active in this movement but much remains to be done.

Underground Overhead

By

GEORGE A. COOPER

Division of Simplified Practice, Bureau of Standards
United States Department of Commerce

In order to maintain the noble beauty of Washington, much of our overhead is underground.

THIS message appears on car cards displayed by one of the electric railways in Washington, D. C. It reminds the public that underground construction and maintenance is much more costly than overhead construction. Similarly, management has learned that overhead expenses are sometimes "underground." Real progress in bringing these "underground" expenses to light can be made by getting at the facts, carefully analyzing and focusing attention intensively on them. One fundamental principle which has been applied successfully in bringing many "underground" expenses to the surface is simplified practice. The managements of 105 specific industries have done this on a national scale, and it is probable that executives of thousands of organizations have applied simplification to their businesses on a purely inter-organization basis.

We make progress in spite of waste and not, as some suppose, because of it. Just because past wastes are "water over the dam" is no reason why present and future wastes should continue. The gears of progress are feeling the increasing friction of competition and management must keep them oiled. One of the best ingredients for this oil is simplification. What it has done for 105 specific industries is a criterion of what it can do for the electric railways, when put into further practice.

Simplified practice, intelligently applied, often means ready sources of supply, low inventories, interchangeability of equipment and parts, more highly skilled workmen and better service to the user or ultimate consumer. All these benefits could be translated into "good will" of the public served.

The statement comes from one public utility in New York that thousands of dollars are being saved annually through the simplification of cables. An engineer of a Pennsylvania utility writes an article appearing in a recent issue of the *Electrical World* which says that his company is profiting in many ways, through the simplification of materials and designs used in substation construction. The Division of Simplified Practice received a letter recently from the purchasing agent of a large utility in Michigan explaining how simplified practice recommendations were being used to advantage by his company and how every recommendation was thoroughly investigated by a standardization committee before being approved. This company has accepted 33 simplified practice recommendations. The simplification and standardization committee of an electric railway, also operating a large number of buses in West Virginia, has been termed the "flying squadron" because of the speed with which it dispatches its meetings and follows through with its recommendations. This committee visits every stockroom on the system and every member "must be shown" before any elimina-

Simplification of Materials and Supplies by a Public Utility Company

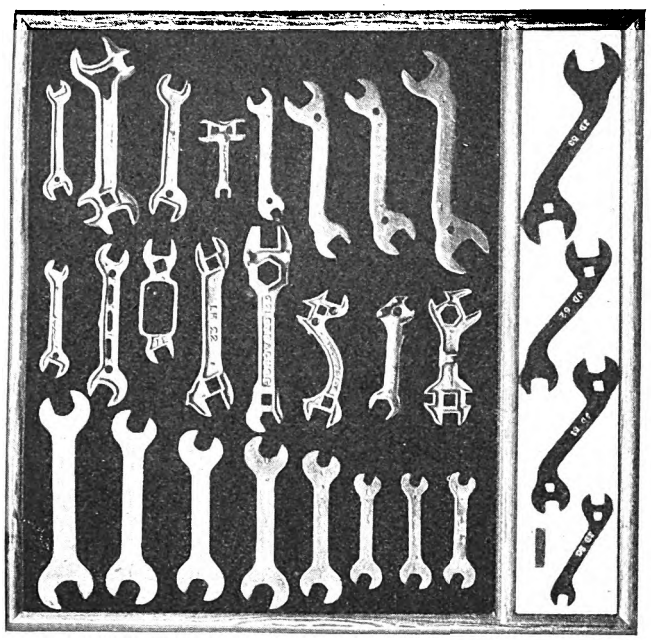
STEPS TAKEN

Standardization committee appointed.
Standardization meetings held monthly.
Standard stock catalog issued.
Record of standard specifications developed by each department.
One standard only for similar material used by several departments.
New standards permitted only on approval of standardization committee.
Special material carried "as special" and followed closely.
Mottoes pertaining to standardization used on intercompany memoranda to stimulate interest.
Standard specifications and standard tests adopted.
Slow moving and overstocked items circularized among affiliated companies.

RESULTS

				Per Cent
Reduced inventory investment	from	$800,000 to	$328,000	— 59
Reduced inventory items	from	8,000 to	3,120	— 61
Reduced labor	from	33 to	23	— 30
Reduced space				50
Improved service				50

Digitized by Google



Wrenches—before and after simplification

tions of, or additions to, standards are made. The efforts of this committee have resulted in a reduction of better than 33 per cent.

Simplification is one of the tools of modern management by which much of our present-day waste can be eliminated. If track gages were different at different locations on the same system, think of the confusion which would result. If the car windows are of different sizes, think of the varieties of glass that must be carried in stock or cut from other sizes with resulting losses. Wastes exist in varying degrees. What about the repair and quick replacement of motor parts and controller parts, not to mention the hundreds of other parts which do break down or wear out? Even a retriever or headlight part can cause all kinds of annoyance and often delay service. It is well to keep these parts in stock, but with a variety of types of equipment, it means more stock clerks, more storage space, more purchasing personnel, more highly skilled mechanics, higher inventories, slower turnover and, sad but too true, inadequate service.

A committee of the American Electric Railway Association has made a number of significant recommendations on this subject.

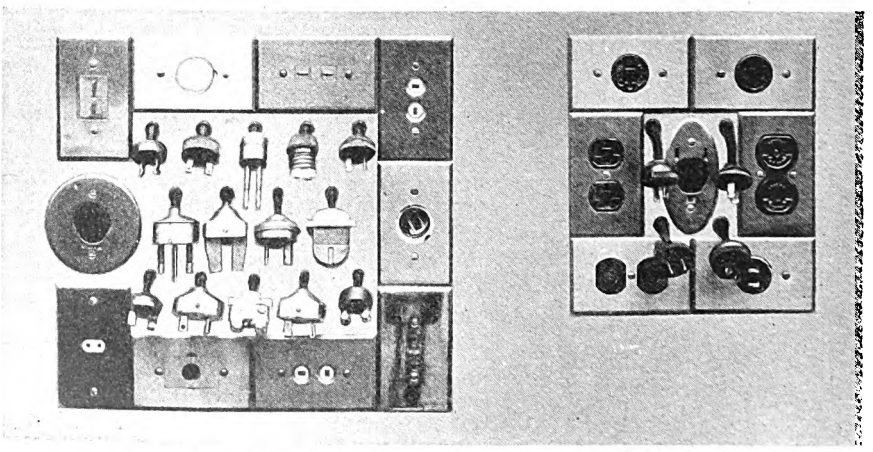
1. Each company should establish its own simplification and standardization committee.
2. The members of this committee should be appointed by the executive head of the company.
3. The members of this committee should represent the departments interested.
4. The chairman of this committee should be the executive head of the stores department.
5. Each member of this committee should be vested with final authority as to the simplification and standardization of stock and the disposition of surplus and obsolete material within his department; other members' opinions should be carefully considered.
6. The chairman of the committee should call meetings and invite those members who, in his judgment, are interested in the materials to be studied.
7. The executive head of the company should make it mandatory for each member so invited to attend these meetings.
8. It should be optional with any member of the committee representing a department of the company to ask any assistants that he may deem necessary to attend the meeting with him.
9. The committee should discuss and review each class of stock periodically at the discretion of the chairman.
10. Minutes in detail should be kept of each meeting and a copy of these should be furnished to all members of the committee and others interested; the minutes should show the action taken by the committee as to the findings in regard to each of the various items, in order that the recommendations of the committee may be complied with throughout the departments concerned.
11. It is further recommended that the chairman of this committee keep in close touch with the work of, and co-operate with, the Division of Simplified Practice of the United States Department of Commerce. Many simplifications already proposed and accepted by industry and endorsed by the Department of Commerce include materials used on electric railway properties. Lists of the simplified sizes, dimensions, etc., of these materials which have been especially arranged for the convenience, use and files of foremen, storekeepers, engineers, purchasing staffs, etc., can be obtained free of charge upon request from the Division of Simplified Practice. It is believed that the concentration of purchases of materials pertinent to electric railway properties on the simplified lines already established by industry and endorsed by the Department of Commerce, whenever possible and wherever practicable, should effect benefits redounding to the advantage of electric railway properties.

One particular electric railway has effected a considerable saving through following just such a program. Minutes of some of the interdepartment meetings to discuss this subject bring out numerous interesting points.

1. The master mechanic is to furnish the purchasing agent with a list of paints carried in stock with a recommendation that certain kinds be returned for credit, if possible. The master mechanic is to arrive at a standard list to be carried by the storekeeper. The present list of 37 kinds is too large.
2. Four kinds of brooms are being carried. Two are enough.
3. Eighty-eight sizes of machine bolts are being carried in stock. The master mechanic and storekeeper must get together, study the requirements and reduce this list of sizes.
4. All parts for No. — compressor are only to be ordered as needed, as this type of compressor will soon be taken out of service.
5. Too many controller parts are being stocked. Certain types will soon be obsolete. Keep in touch with other divisions and order only as needed.
6. Three kinds of greases are to be used until stock is depleted and not reordered.
7. Eighty-five sizes of steel are to be studied and the purchasing agent informed by the master mechanic and storekeeper as to standard sizes to be stocked in the future.
8. A list of truck parts is to be sent the purchasing agent with a recommendation that certain items are to be returned for credit, or sold to other companies using this equipment.

Just such a specialized study, or simplified practice, if you please, resulted in a reduction in the value of stock carried, from $80,000 to $20,000 in one local storeroom on the system. Other storerooms effected comparable reductions.

Electric railways have contributed much in helping



Electric outlets and plugs—before and after simplification

Digitized by Google

manufacturers effect simplified practice recommendations through their American Electric Railway Association. More than a score of recommendations for simplified practice have been accepted. These are:

No. 16—Lumber
No. 26—Steel Reinforcing Bars (Cross-sectional Areas)
No. 28—Sheet Steel
No. 35—Steel Lockers
No. 36—Milling Cutters
No. 45—Grinding Wheels
No. 47—Cut Tacks and Small Cut Nails
No. 48—Shovels, Spades and Scoops
No. 49—Sidewalk Lights
No. 53—Steel Reinforcing Spirals
No. 56—Carbon Brushes and Brush Shunts
No. 57—Wrought-Iron and Wrought-Steel Pipe, Valves, and Pipe Fittings
No. 58—Classification of Iron and Steel Scrap
No. 60—Parking of Carriage, Machine and Lag Bolts
No. 63—Metal Spools
No. 71—Turnbuckles
No. 73—One-piece Porcelain Insulators
No. 76—Ash Handles
No. 90—Hacksaw blades
No. 95—Skid Platforms
No. 100—Welded Chain

These particular recommendations should be of interest to the engineer, purchasing agent, superintendent, storekeeper and foreman of every electric railway. The management of every company should ascertain if these schedules have been investigated, or adopted and if not, why not. The Division of Simplified Practice will send complimentary sheet form copies of any recommendations upon receipt of written request.

Results of a Three-Year Simplification Campaign by a Public Utility Company

	Number of Varieties Before	After	Per Cent Reduction
Iron	75	49	35
Insulators	13	7	46
Bolts	138	70	49
Paints	24	12	50
Alley arms	3	1	66
Meters and transformers	Standard sizes established. Many items eliminated.		

RESULTS

1. Items reduced 16 per cent.
2. Inventories reduced $182,000, or 36 per cent.
3. Inventory discrepancies reduced from 1.9 to 0.4 per cent.
4. Expenses reduced 36 per cent.
5. Turnover increased 100 per cent.

Bernard J. Yungbluth, president of the International Railway Company of Buffalo, N. Y., has said:

> . . . Every dollar's worth of obsolete or scrap material turned into cash, every dollar's worth of excess supply returned for reissue, every dollar's worth of purchases postponed until actually needed, is a dollar added to the cash box, just as valuable as though obtained through the sale of our product.

If the little-called-for varieties of supplies and equipment used by electric railways could be eliminated in manufacture through the co-operation of the electric railways and manufacturers, would not the money saved be money in the cash box?

The simplified invoice form has been successfully promulgated because representative users had the vision to see what it would mean for industry. The department stores are now sponsoring a survey of methods and supplies used in wrapping and packing merchandise for transmission to the customer. When the survey is completed and the resulting recommendations put into effect, it will mean a savings of millions of dollars to department stores. Many electric light and power companies are now urging a simplification of pole line hardware because they realize the benefits inherent in such a program. Users of paper are responsible for studies now being made which should ultimately lead to simplification and standardization.

What is to prevent an organized co-operative effort on the part of the electric railway industry to extend the scope of its present studies and come forward with requests that lines of materials and equipment be simplified which are purchased chiefly by them? After all, regardless of wastes in manufacture and distribution, the consumer pays the bill and the electric railways are very large consumers.

To the manufacturer, simplified practice means:

1. Less capital tied up in raw materials, semi-finished stock, storage space and repair parts.
2. More economical manufacture through larger units of production, reduced variety of manufacturing units, larger runs, less frequent changes, higher rates of individual production, accurate and proper estimating for production, more effective stock control.
3. Better and simplified inspection, less idle equipment, reduced amount of equipment, greater ease in securing raw materials and conserving raw products, and cheaper handling of stocks.
4. Reduced clerical overhead, standardized material inventories, more efficient labor due to making simpler the training of employees.
5. Better earnings, through increased individual production, made possible by longer runs, improved morale, skill increased by repetitive process, less labor idle from preventable causes, more permanent employment as contrasted to present seasonal employment, less difficulty in getting help.
6. Better service to the trade in better quality of product, more prompt delivery, decreased quantity of sizes of packing required, fewer packages broken in transit, less chance of errors in shipment, less obsolete material, more efficient sales force, increased rate of turnover, intensified sales momentum, easier financing, fewer factory shutdowns, the focusing of attention on individuality in those features where there should be individuality, discouragement of attempts to apply it to those features where it is superficial and useless, and where standardization and quality should prevail, easier plans and schedules, and decrease in number of production processes.

To the distributor, the adherence to simplified practice will mean:

1. Increased rate of turnover due to all live numbers.
2. Elimination of slow-moving stock, staple line, easy to buy and quick to sell, more effective sales force, greater concentration of sales on fewer items and standard patterns that are proved best sellers.
3. Decreased capital investment in stock on hand, repair parts on hand, storage space required, less stock depreciation and obsolescence, decreased overhead on handling charges, clerical work, better service through lower prices, quicker and more reliable deliveries.

Gains to the ultimate consumer through simplified practice are:

1. Better prices than would otherwise be possible.
2. Better quality of product through ability of manufacture to concentrate on better design and through the reduction of manufacuring expenses.
3. Better service and prompter delivery of new equipment, replacements and repair parts.

Digitized by Google

A.E.R.A. Announces Program

PLANS for the annual convention of the American Electric Railway Association and its affiliated organizations are now virtually complete. The sessions will be held at the Fairmont Hotel, San Francisco, beginning Monday morning, June 23, and continuing to Thursday noon, June 26. The sessions of the American Association will be held Monday, Tuesday and Wednesday mornings, and the affiliated associations will meet in the afternoons of Monday and Wednesday. The Engineering Association and the Transportation and Traffic Association also will have sessions on Thursday morning. Luncheon meetings of the various associations will be held on Monday, Tuesday and Thursday.

The Advisory Council program this year will consist of a banquet to be held Monday evening. It will be preceded by a reception. At this meeting the award of the Charles A. Coffin prizes will be made.

Following are the programs, as corrected up to May 22.

American Association

General Theme—1930's Challenge to Transportation Men

Monday, June 23, 10 a.m.

GOLD BALLROOM,
FAIRMONT HOTEL, LOBBY FLOOR

Subject of the Day—"The Future of an Indispensable Service Is at Stake"

Welcome, by Honorable James Rolph, Jr., Mayor of San Francisco, Cal.

Address of the President—Paul Shoup, chairman of the board Pacific Electric Railway, San Francisco.

"Revenue Prospects of Electric Interurban Transportation," by D. W. Pontius, president Pacific Electric Railway, Los Angeles, Cal.

"Making the Most of Existing Street Railway Properties," by Samuel Kahn, president Market Street Railway, San Francisco, Cal.

Report of Managing Director Charles Gordon, American Electric Railway Association, New York, N. Y.

Luncheon—San Francisco Electrical Development League

PALACE HOTEL, 12 m.

The San Francisco Electrical Development League has extended a cordial invitation to delegates to attend this luncheon, at which there will be brief addresses by prominent electric railway executives.

Advisory Council Banquet

PALM COURT AND ROSE ROOM,
PALACE HOTEL

RECEPTION 6:30 P.M. DINNER 7 P.M.

Report of Advisory Council.
Toastmaster—President Paul Shoup.
Presentation—Charles A. Coffin Foundation Award.
Address by nationally prominent speaker.

*The Trainmen's Conference Demonstration will be given by the employees of the Market Street Railway under the leadership of T. A. Bragg. "Interesting the Customer" is the subject which has been selected for this demonstration.

Tuesday, June 4, 10 a.m.

GOLD BALLROOM,
FAIRMONT HOTEL, LOBBY FLOOR

Subject of the Day—"The Industry's Effort to Help"

Presentation—Anthony N. Brady Safety Award by President Paul Shoup.

Report—Committee on Nominations—James P. Barnes, president Louisville Railway, chairman.
Election of Officers.

"Street Traffic Economics," by G. A. Richardson, vice-president and general manager Chicago Surface Lines, Chicago, Ill.

"Progress in Meeting the Industry's Equipment Problem," by Dr. Thomas Conway, Jr., president Cincinnati & Lake Erie Railroad, Philadelphia, Pa.

"The Man on the Platform—Our Greatest Potential Asset," by J. N. Shannahan, president Omaha & Council Bluffs Street Railway, Omaha, Neb.

"Conference Training—Its Technique and Possibilities," by Edward Dana, general manager Boston Elevated Railway, Boston, Mass.

Informal Round Table Luncheon Conferences—12:45 p.m.

FAIRMONT HOTEL

No. 1—Relief of Traffic Congestion—G. A. Richardson, *sponsor*.

No. 2—Fare Structures—A. S. Richey, *sponsor*.

No. 3—Transportation Problems of the Small City—F. L. Butler, *sponsor*.

No. 4—Interurban Management and Operation—D. W. Pontius, *sponsor*.

No. 5—Employee Relations and Trainmen's Conference Demonstration*—Edward Dana, *sponsor*.

No. 6—Development of Cars and Car Equipment — Dr. Thomas Conway, Jr. *sponsor*.

No. 7—Development of Buses and Trolley Buses—Edward A. West, *sponsor*.

No. 8—The Taxicab as a Factor in Community Transportation—J. B. Stewart, Jr., *sponsor*.

Digitized by Google

# of San Francisco Convention

Wednesday, June 25, 10 a.m.

GOLD BALLROOM,

FAIRMONT HOTEL, LOBBY FLOOR

Subject of the Day—"The Public Holds Control"

Award—Electric Traction Speed Contest—T. Fitzgerald, vice-president Pittsburgh Railways, chairman.

"Transportation—A Community Problem," by H. G. Taylor, manager public relations, car service division American Railway Association, Washington, D. C.

"Public Responsibility in Regulating a Competitive Industry," by John E. Curtiss, chairman State Railway Commission, Lincoln, Neb.

"Taxation," by M. D. Lack, tax counselor California Taxpayers' Association, Los Angeles, Cal.

"Our Contact with the U. S. Chamber of Commerce," by J. N. Shannahan, president Omaha & Council Bluffs Street Railway, Omaha, Neb., national councilor.

"National Relations," by C. D. Cass, general counsel American Electric Railway Association, Washington, D. C.

Official Business.

Installation of Officers.

General Luncheon Conference

Thursday, June 26, 12:45 p.m.

FAIRMONT HOTEL

FRANKLIN T. GRIFFITH, Chairman

As a fitting climax to the convention, this general luncheon conference has been arranged for all delegates and guests. The discussion will summarize the high spots of the convention and the status of the industry.

Adjournment.

Accountants' Association

Monday, June 23, 2 p.m.

FLORENTINE ROOM, FAIRMONT HOTEL, LOBBY FLOOR

Address of President.

Report of Executive Committee.

Report of Secretary-Treasurer.

Report—Committee on Standard Classication of Accounts—M. W. Glover, general auditor West Penn Railways, Pittsburgh, Pa., chairman.

Discussion.

Report—Subcommittee on Bus Accounting—E. A. Tuson, general auditor Public Service Coordinated Transport, Newark, N. J., chairman.

Discussion.

"The Capital Structure of Public Utilities," by John F. Forbes, resident partner Haskins & Sells, San Francisco, Cal.

Discussion.

Report—Committee on Nominations—T. P. Kilfoyle, auditor Cleveland Railway, chairman.

Election of Officers.

Tuesday, June 24, 12:45 p.m.

LUNCHEON MEETING, MARK HOPKINS HOTEL

Informal gathering of accountants and railway men interested in accounting subjects. Luncheon will be followed by a discussion of accounting problems.

Wednesday, June 25, 2 p.m.

FLORENTINE ROOM, FAIRMONT HOTEL, LOBBY FLOOR

"The Auditor—Figurer or Analyst," by Leslie Vickers, economist American Electric Railway Association, New York, N. Y.

Discussion.

Report—Committee on Budgetary Control—R. Gilman Smith, statistician North American Company, New York, N. Y., chairman.

Discussion.

Report—Committee on Resolutions—J. E. Heberle, assistant to the president Capital Traction Company, Washington, D. C.

Installation of Officers.

Presentation of Past-President's Badge.

New Business.

Claims Association

Monday, June 23, 2 p.m.

GRAY GALLERY,

FAIRMONT HOTEL, LOBBY FLOOR

Address of President.

Report of Executive Committee.

Report of Secretary-Treasurer.

Report—Committee on Nominations—Wallace Muir, general attorney Kentucky Traction & Terminal Company, Lexington, Ky., chairman.

Election of Officers.

Following the election of officers the meeting will be turned over to the Pacific Claim Agents' Association.

PRESIDENT B. F. BOYNTON, Chairman

"Bus Accidents—Their Causes and Prevention," by S. A. Bishop, general claim agent Pacific Electric Railway, Los Angeles.

W. R. Sherman, general claim agent Spokane, Portland & Seattle Railway, Portland, Ore.

"Methods of Impressing Employees with the Importance of Obtaining Witnesses and Gathering Material Facts," by A. E. Nicolletti, assistant claim agent Key System Transit Company, Oakland, Cal.

J. E. McClain, claim agent Austin Street Railway, Austin, Tex.

"The Value of Motion Pictures in Claims Work," by C. M. McRoberts, general claim agent Los Angeles Railway.

Tuesday, June 24, 12:45 p.m.

LUNCHEON MEETING, MARK HOPKINS HOTEL

Informal Round Table Discussion on the "Ambulance Chasing" Problem.

Wednesday, June 25, 2 p.m.

GRAY GALLERY,

FAIRMONT HOTEL, LOBBY FLOOR

Report-Committee on Uniform Negligence Law—J. S. Kubu, assistant superintendent accident dept., Cleveland Railway, chairman.

Discussion.

"Should the Company Surgeon Call on the Injured Immediately after an Accident or Wait Until Liability Is Determined," by J. A. Sweeney, assistant claims attorney Chicago South Shore & South Bend Railroad, Gary, Ind.

M. C. Chapman, Jr., attorney Key System Transit Company, Oakland, Cal.

Digitized by Google

Report—Committee on Claims Department Practices—Bert C. Wood, general claim agent Pennsylvania-Ohio Public Service Corporation, Youngstown, Ohio, chairman.
Discussion.

"Blind Accidents and How to Handle Them," by G. T. Hellmuth, claims attorney Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.
J. W. Giltner, chief claim agent Northern Ohio Power & Light Company, Akron, Ohio.
Report—Committee on Safety—P. W. Klabunde, general claim agent Milwaukee Electric Railway & Light Company, Milwaukee, Wis., chairman.

Discussion.

"Recent Legislation Affecting Guests of Motorists Who Are Injured in Accidents," by Earl S. Nelson, claims attorney Pacific Northwest Public Service Company, Portland, Ore.
Arthur L. Levinsky, attorney Stockton Electric Railway, Stockton, Cal.

Installation of Officers.

Presentation of Past-President's Badge.

Engineering Association

Provision will be made for discussion after each address or group of committee reports.

Monday, June 23, 2 p.m.

RED ROOM, FAIRMONT HOTEL, LOBBY FLOOR

Engineering Day

Address of President.
Report of Executive Committee.
Report of Secretary-Treasurer.
"Electric Railway Special Trackwork," by B. P. Legaré, engineer maintenance of way and construction Market Street Railway, San Francisco, Cal.

"The Relations of Purchasing and Engineering," by Frank M. Harris, chief of bureau of specifications and estimates, department of engineering, Pacific Gas & Electric Company, San Francisco, Cal.

"The Engineer and His Valued Influence in Western Developments," by A. T. De Forest, vice-president United States Steel Products Company, San Francisco, Cal.

"London Omnibuses and Other Forms of Passenger Transportation," by George J. Shave, operating manager and chief engineer London General Omnibus Company, London, England.

"Economies of the High-Speed Street-Car Motor and Drive," by C. Bethel, manager railway motor engineering department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Wednesday, June 25, 2 p.m.

RED ROOM, FAIRMONT HOTEL, LOBBY FLOOR

Report—Standing Committee on Rolling Stock—T. H. Nicholl, chairman.
Reports of Rolling Stock Committees:
No. 1—Manual Review—W. C. Bolt, chairman.
No. 2—Motor Coaches—P. V. C. See, chairman.
No. 3—Car Design—H. H. Adams, chairman.
No. 4—Lighting—R. W. Cost, chairman.
No. 6—Lubrication—J. H. Lucas, chairman.

Report—Heavy Electric Traction Committee—L. C. Winship, chairman.

Report—Standing Committee on Power—W. E. Bryan, chairman.
Reports of Power Committees:
No. 1—Manual Review—J. Walter Allen, chairman.
No. 2—Mercury Power Rectifiers—N. W. Codding, chairman.
No. 3—Power Contracts—Ralph H. Rice, chairman.
No. 4—Power Supply for General Purposes—J. F. Neild, chairman.
No. 5—Catenary Specifications—Dwight L. Smith, chairman.
No. 6—Trolley Wire Wear—H. S. Murphy, chairman.

"Engineering Challenges of the West," By Lester S. Ready, consulting engineer, San Francisco, Cal.

Report—Standing Committee on Way and Structures—C. A. Smith, chairman.
Reports of Way and Structures Committees:
No. 1—Manual Review—W. R. Dunham, Jr., chairman.
No. 2—Special Trackwork—E. M. T. Ryder, chairman.
No. 3—Weed Elimination—J. I. Catherman, chairman.
No. 4—Wheel and Rail Contours—P. J. Mitten, chairman.
No. 5—Wood Preservation—C. A. Smith, chairman.
No. 6—Arc Welding—Chester F. Gallor, chairman.
No. 7—Alloy Steels for Special Trackwork—P. A. Kerwin, chairman.

Report—Standing Committee on Purchases and Stores—A. L. Pischer, chairman.
Reports of Purchases and Stores Committees:
No. 1—Manual Review—J. Fleming, chairman.
No. 2—Unit Piling and Standard Packages—W. E. Scott, chairman.
No. 3—Stores Investment and Costs—W. S. Stackpole, chairman.

Thursday, June 26, 10 a.m.

RED ROOM, FAIRMONT HOTEL, LOBBY FLOOR

Report—Committee on Co-operation with U. S. Department of Commerce—E. P. Goucher, engineer of way and structures Capital Traction Company, Washington, D. C., chairman.

Reports of Purchases and Stores Committees:
No. 4—Pricing Methods and Records—A. A. Ordway, chairman.
No. 5—Standardization and Simplification of Stock—C. A. Harris, chairman.
No. 6—Material and Supplies Control—E. F. Kelley, chairman.
"Elimination of Waste," by A. S. Duncan, assistant director of finished stocks Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Reports of Way and Structures Committees:
No. 8—Pavement—S. Clay Baker, chairman.
No. 9—Motor Bus Garage Design—Morse W. Rew, chairman.
No. 11—Track Construction—C. L. Hawkins, chairman.
No. 12—Rail Corrugation—H. S. Williams, chairman.
No. 14—Rails—C. A. Alden, chairman.
No. 15—Track Gage—C. H. Clark, chairman.
No. 16—Foundations for Special Trackwork—W. A. Underwood, chairman.

Reports of Power Committees:
No. 7—Trolley Construction Specifications—L. R. Wagner, chairman.
No. 10—Lightning Protection—A. Schlesinger, chairman.
No. 11—Distribution Systems—J. Leisenring, chairman.
No. 12—Ferrous and Non-Ferrous Materials—H. F. Brown, chairman.
No. 13—Trolley Voltage Surveys—A. J. Klatte, chairman.

Reports of Rolling Stock Committees
No. 8—Fire Hazards in Shop Practices E. J. Jonas, chairman.
No. 9—Noise Reduction—H. S. Williams chairman.
No. 11—Current Collecting Devices Hugh Savage, chairman.
No. 13—Limits of Wear—W. T. Vivian chairman.

"Modern Vehicles and Equipment for Urban Transportation," by C. A. Burleson, Transportation Engineering Department General Electric Company, Erie, Pa.

Report—Committee on Nominations—F. H. Miller, vice-president and general manager Louisville Railway, Louisville, Ky., chairman.
Election of Officers.
Installation of Officers.
Presentation of Past-President's Badge.

Transportation and Traffic Association

Monday, June 23, 2 p.m.

GOLD BALLROOM,
FAIRMONT HOTEL, LOBBY FLOOR

Address of President.
Report of Executive Committee.
Report of Secretary-Treasurer.
Report—Committee on Nominations—W. H. Boyce, commercial manager Pittsburgh, Railways, Pittsburgh, Pa., chairman.
Election of Officers.
Other Business.

Report—Committee on the Transportation Employee—Clinton D. Smith, superintendent department of personnel Cleveland Railway, Cleveland, Ohio, chairman.
Discussion.

Report—Committee on the Movement of the Vehicle—C. W. Wilson, manager research department Pittsburgh Railways, Pittsburgh, Pa., chairman.
Discussion.

Tuesday, June 24, 12:45 p.m.

LUNCHEON MEETING, FAIRMONT HOTEL

Transportation Problems of the Small City
F. L. BUTLER, Sponsor

Wednesday, June 25, 2 p.m.

GOLD BALLROOM,
FAIRMONT HOTEL, LOBBY FLOOR

Transportation and Traffic Day

Report—Committee on Operating Economics—Joe R. Ong, director of research Cincinnati Street Railway, chairman.
Discussion.

"The Company, the Public and the Municipalities," by Hon. Edwin O. Edgerton, former president California Railroad Commission, San Francisco, Cal.
Discussion.

Thursday, June 26, 10 a.m.

GOLD BALLROOM,
FAIRMONT HOTEL, LOBBY FLOOR

Report—Committee on the Passenger—William W. Holden, chairman; manager traction department San Antonio Public Service Company, San Antonio, Tex.
Discussion.
Report—Committee on The Equipment—L. C. Datz, chief engineer St. Louis Public Service Company, chairman.
Discussion.
General Discussion.
Installation of Officers.
Presentation of Past-President's Badge.

Entertainment

Sunday, June 22

9 a.m.—Golf at San Francisco Country Clubs.
2 p.m. and 3 p.m.—Automobile trips.
8-10 p.m.—Concerts in lobbies of principal hotels.

Monday, June 23

9-10 a.m.—Chinese Orchestral Groups, in lobby of Fairmont Hotel.
3:30-5 p.m.—Ladies' informal reception and tea, in Laurel Court, Fairmont Hotel Music by Rudy Seiger's orchestra.
6:30 p.m.—Advisory Council reception and banquet. See American program. Music by Uzia Bermoni's Palace Hotel orchestra.

Tuesday, June 24

9:30-11:30 a.m.—Shopping tours for the ladies.
2:45 p.m.—California relief map, Ferry Building, foot of Market Street.
8 p.m.-1 a.m.—"A Night in Hawaii"—Venetian Terrace and Pool Fairmont Hotel.
Johnny Noble's orchestra and Hawaiian Girls' Glee Club.
Chinatown trips.
Informal dancing. Music by Anson Weeks orchestra.

Wednesday, June 25

11:30 a.m.—Automobile trip for the ladies, including luncheon at Taits-at-the-Beach and tea in the gardens of Mr. and Mrs. Paul Shoup's Los Altos estate.
9 p.m.-2 a.m.—Old California Ball, Fairmont Hotel. Music by Anson Weeks orchestra.

Thursday, June 26

No arranged programs. "Free for all."
Delegates will receive a post-convention plan form when they register giving a choice of a number of trips.

Digitized by Google

Awards Made for the Second Period of
MAINTENANCE CONTEST

Ideas Submitted by Railway Men in Toronto Baltimore, Cleveland and San Diego Win Prizes

Walter McRae

Angus Scott

Charles Herms

REPRESENTATIVES of four electric railway properties were among the prize winners in the second period of ELECTRIC RAILWAY JOURNAL Maintenance Contest, ending April 30. In the department of rolling stock and shops, first prize was won by Walter McRae, superintendent of rolling stock and shops, Toronto Transportation Commission, for his special armature nut wrench. A description of this device was published in the May issue. First prize in the track department went to F. B. Habercam, superintendent of welding, United Railways & Electric Company of Baltimore. His article concerning an iron rod that acts as a dam for weld material appeared in the April issue. In the electrical and line department, the winner was Angus Scott, assistant superintendent of overhead lines, who submitted a description of warning lights on tower wagons, which is published elsewhere in this issue. The winner in the bus and garage department was Charles Herms, general superintendent and carhouse foreman, San Diego Electric Railway. The device for which this award was made was a door engine used for pressure lubrication. Description of it was published in the April issue. Both Mr. Scott and Mr. Herms were prize winners in previous periods of ELECTRIC RAILWAY JOURNAL Maintenance Contest.

WALTER R. McRAE

BORN at Bolsover, Ontario, Canada, in 1874, Walter R. McRae received his education in the public schools of Toronto. He followed this with courses in the Collegiate Institute and Technical School of that city, and also a course in electric lighting and railways in the International Correspondence Schools. His business career began with the Ball Electric Light Company and the Toronto Incandescent Light Company, but in 1892 he entered the service of the Toronto Railway under Sir William MacKenzie, being the first employee engaged in the rolling stock department of the company. Mr. McRae continued with the Toronto Railway in various capacities in the electrical and mechanical departments until 1921, when he entered the service of the Toronto Transportation Commission as superintendent of rolling stock and shops. Thus Mr. McRae has had a continuous experience in the railway mechanical field of approximately 39 years.

F. B. HABERCAM

F. B. HABERCAM is a native of Baltimore and received his early education in the public schools of that city. He supplemented this with one year in business college and a course on foremanship and management at the local Y.M.C.A. Mr. Habercam entered the service of the United Railways & Electric Company as progress clerk in 1911, and was promoted to material clerk in 1913. Since 1922 he has filled the position of superintendent of welding.

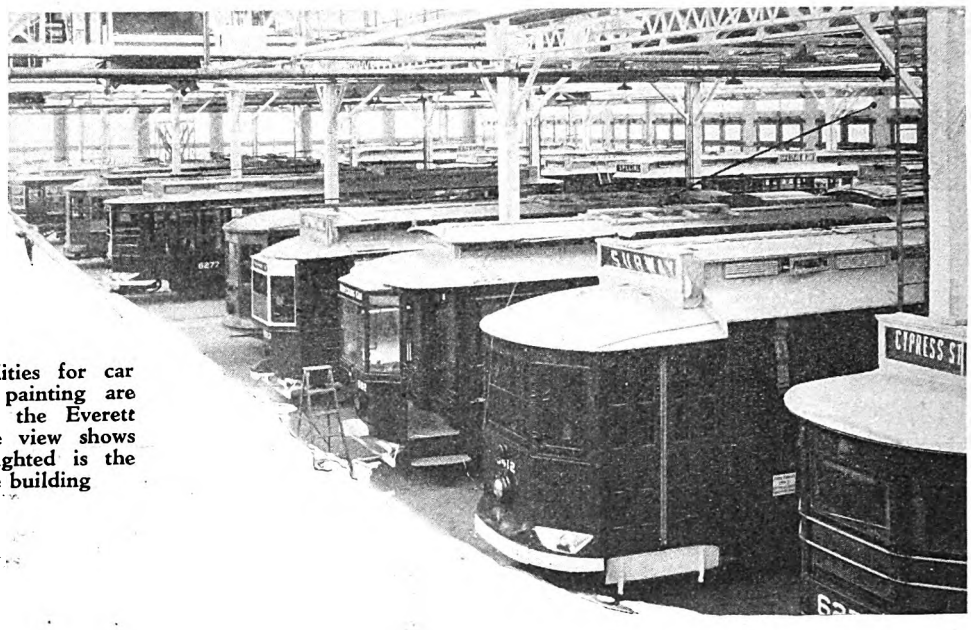
ANGUS SCOTT

FOLLOWING his graduation from the Case School of Applied Science, in 1922, Angus Scott entered the service of the Drew Electric & Manufacturing Company, of Cleveland, as salesman of railway supplies. In 1924 he became associated with the Cleveland Railway. After a varied experience in several departments he displayed a special aptitude for the overhead line work and was appointed assistant superintendent in that service. He holds that position at the present time. At the close of the second period of the ELECTRIC RAILWAY JOURNAL Maintenance Contest in 1929 Mr. Scott was awarded the prize in the electrical and line department.

CHARLES HERMS

AFTER a varied career, which included supervision of a mill for the San Antonio Portland Cement Company and the reconditioning of a telephone and electrical system for the Boston & Superior mine in Arizona, Charles Herms began his street railway career as a general repair man with the San Antonio Public Service Company in 1919. At the end of four years in this capacity he became foreman of a crew engaged in the remodeling of cars, but left San Antonio in 1923 to join the San Diego Electric Railway as general shop and carhouse foreman, a position which he holds at the present time. During the war Mr. Herms was attached to the First Army Corps in a motor repair unit. Mr. Herms has taken an active interest in ELECTRIC RAILWAY JOURNAL Maintenance Contests, and in 1929 was the winner of a first prize in the bus and garage division.

Digitized by Google



Excellent facilities for car repair and painting are provided at the Everett shops. The view shows how well lighted is the center of the building

Repairing 900 Cars a Year

Work schedule at new Everett shop calls for completion of seventeen cars a week, including general overhauling and painting for all divisions except the Cambridge-Dorchester subway and East Boston tunnel

CAR and bus body overhauling on the Boston Elevated Railway concentrated at the New Everett shops, except for the Cambridge-Dorchester subway and East Boston tunnel cars, which are repaired at a shop designed and built for the purpose in Cambridge just beyond the Harvard Square terminal of the Cambridge subway.

In order to have a steady flow of work through the Everett body and paint shops, a definite schedule has been adopted which calls for the completion of seventeen cars each week in the paint shop. This is the maximum number which can be put through for general repairs and painting with the present number of employees. On this basis the entire plan of handling repair work at Everett is laid out.

If a car is to be kept in good condition during its life, it is believed necessary by the management to put it through the shops approximately every fifteen to eighteen months. Assuming a life of about twenty years, the average car would go through the shops from twelve to fifteen times to keep it in first-class condition. If the cars are sent through at about this rate, it is the experience in Boston that they will easily have the life of twenty years. Less frequent shopping, while it may appear to be an economy, results in more rapid deterioration of the cars. Infrequent painting, particularly, increases repairs to the cars when they do come into the shops, and while it saves expense for the time being, the charges in the long run make the cost of upkeep a great deal more owing to decay and corrosion.

The time when the individual car is sent in for repairs is, under the present procedure, determined by the carhouse foreman. With the approval of the district supervisor he is the one individual who passes on the question of when a car should be sent in to the shops for general repairs. Three factors govern the decision of the foreman: the policy of the management, the condition of the car, and accidents. While the amount of money available for maintenance determines to some extent the policy of the management with respect to general repairs, it is not possible to run a car too long without going through the shops, and failures would be too numerous. Frequently after accidents it is necessary to send cars to the Everett shop, as the collisions cause damage too great to be repaired at the carhouse.

When the carhouse foreman, with the approval of his district supervisor, has decided to send a car to the shops, he first fills out a card stating in detail the work that must be done on it. This card is attached to the car and the transportation department is notified to furnish a crew to take the car to the shops.

When the car arrives at the shops it is placed on a siding in the yard for inspection. It often is found on thorough examination that the repair work to be done is much more than that reported by the carhouse foreman. Some of the most serious defects, such as rotted

Digitized by Google

sills and posts, are not apparent until some of the sheathing is stripped off and the framework of the car is exposed. After the condition of the car is ascertained, it is placed on the waiting list to go through the shops.

In order to keep the paint shop busy, it may be necessary to hold some cars requiring heavy repairs in order to let in cars which need only minor work. It also may be necessary to order special material which must be received before the work can start. Then again, the condition of the car may be so bad that the management may be requested to decide whether the car should be repaired or scrapped. So far as possible, however, cars are passed through the shops in the order in which they are received from the carhouse.

As soon as a berth in the shop is vacant, the next car scheduled for repairs is transferred from the yard to the shop. With the completion of the work on a preceding car, the crew of men released is assigned to the new car. If the car just received has been in an accident, the necessary repairs are made, the car is retouched with paint and put back in service, unless the damage is so great that more general repairs are necessary. Cars in for

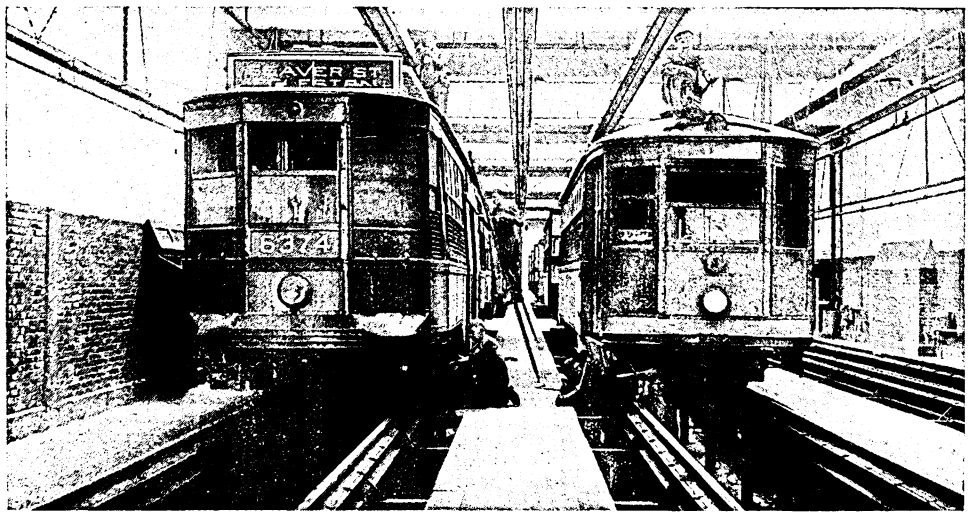
in the Boston Elevated Shop

general overhauling are first stripped. All the detachable parts are removed from the car body. Window screens are sent to the machine shop for repairs, after which they are transferred to the paint shop for cleaning and dipping. When repairs are needed on sash and doors they are removed and sent to the sash and door department for such repairs as are necessary and then returned for installation. The door operating mechanism is taken down and overhauled thoroughly. Seat cushions and backs are all removed, placed in special racks, sent to the seat repair department and renovated, after which they go to the paint shop for cleaning and repainting. The seat frames are likewise gone over.

After all these removable parts are taken off, the repairs to the body framing are begun. If the car is old and there are indications that the framing has rotted, the outside sheathing is all stripped off and in some instances the floor is removed also. All rotted portions, such as posts and framing, are removed carefully so as to damage them as little as possible. They are sent to the wood mill so that exact duplicates can be made. This has been found the most practical method, since the original timbers are specially made to fit the contour of the car and to allow clearance for rivet heads, bolts, angles and other parts. With the complete equipment of machines the mill can duplicate a piece of complicated framing much more quickly and at less cost than would be possible if the mechanics tried to fit the work on the job. The sheathing plates, if they are badly corroded or bent, are sent to the sheet metal department for straightening or duplication. The heavier metal work and framing is sent to the machine shop and the blacksmith shop to be straightened or duplicated. Collision bumpers, which frequently are badly bent, are taken off if necessary and are reheated and bent to the proper shape.

After repairs have been made to the various parts removed, or duplicates are furnished, they are returned to the car for installation. Meanwhile, the framing has been restored to its original condition. The car is then resheathed, the floor is re-laid and it is made ready for replacement of the parts which are ready. The doors and windows are replaced first. When they are on, the car is sent to the paint shop. The final trimming, including replacement of seats and window screens, is not done until the car is practically ready for delivery to the carhouse. At this time all glass is cleaned and the car is sent back for duty.

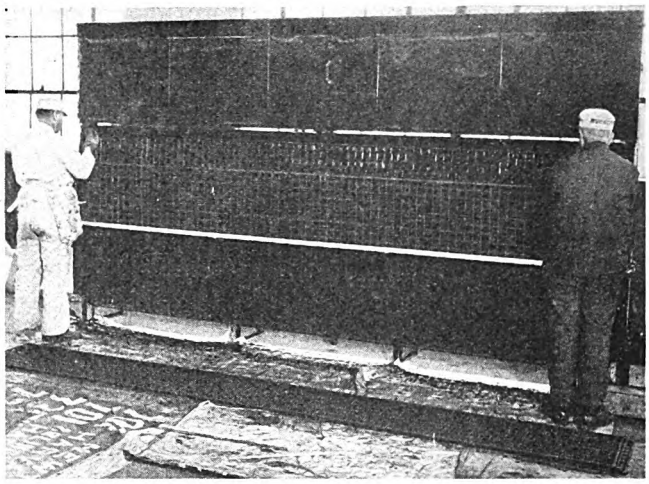
When the car has been transferred to the paint shop, it is gone over to get it ready for painting. First it is cleaned thoroughly, scraped and sand-papered. If any of the old paint is blistered or unfit to take new paint, it is removed with a paint remover down to the bare metal or wood. After use of the paint remover the surface is thoroughly washed. All bare metal or new work is thoroughly primed, if this has not been done already in the wood shop, as repairs progress. Then the entire car is gone over, all holes and dented spots are puttied up. The car roof is then painted. This obviates any danger of daubing the sides of the car, which might happen if the



Inspection of cars at the carhouses permits many minor repairs and adjustments to be made without the need for sending them to the Everett shops

Digitized by Google

roof were painted last. Next, the main body or under coat is put on. Some years ago the cars were all painted a fairly dark green. This was changed to a bright orange and at the present time there are no more green cars in service. This makes it necessary to be certain that the main body or under coat completely covers the green, without affecting the color of the finished coat.



Window screens are cleaned and then painted by dipping in narrow vats

After the main body coat has dried thoroughly, the enamel coat is put on. This is the final coat in all instances except the main line elevated cars equipped with wooden sash, which are given a coat of finish varnish. After the enamel coat all numbering and lettering, which is all hand work, is done.

As the exterior painting progresses, the inside work is being done simultaneously. As a rule only varnish is used on the interior, except for the sash, doors and headlining. The floors are given a heavy coat of floor paint. Trucks are painted with a paint made up by boiling the left-over paint skins with the addition of whatever pigment is necessary to bring the paint to a standard color.

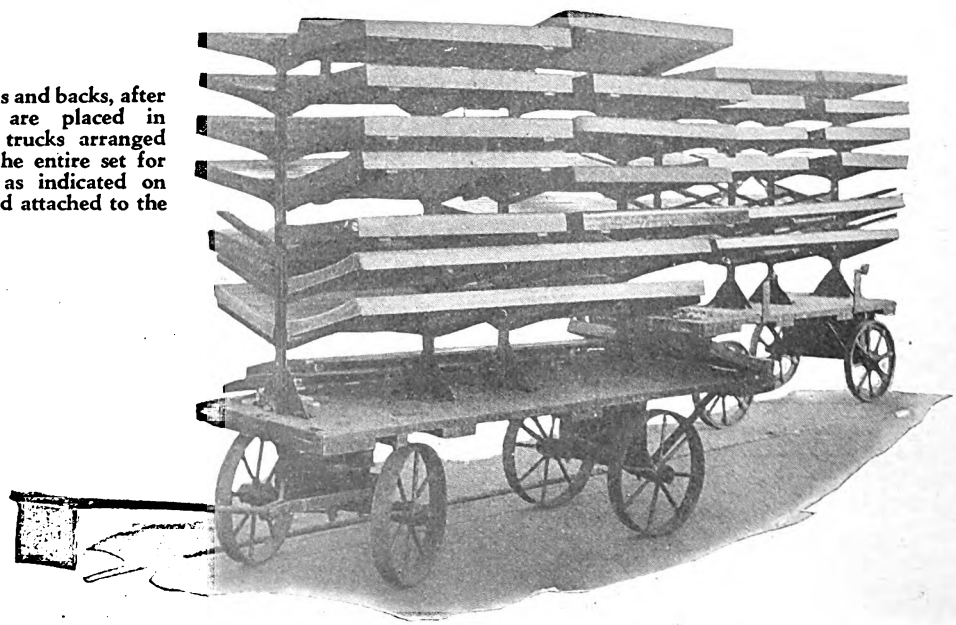
Following the last coat and drying of the car, the glass is cleaned and the car is retrimmed with replacement of the hardware, seat cushions and backs, and window screens. Finishing of these other parts is done in other departments of the paint shop. The seats, cushions and sash are kept together for each individual car, being transported on trucks designed specially for the purpose.

Buses follow the same procedure as cars. On account of the lighter construction and the more severe strains imposed by rough roads, it frequently is necessary to make more extensive repairs to the framing than is made on cars. The bodies are somewhat smaller than those of cars, so that the time taken is approximately the same.

As an indication of the amount of work handled in the Everett shops, it may be stated that 797 passenger cars were given general repairs during 1929, and 664 cars were given light repairs. These figures are considerably lower than the corresponding figures for 1928. The difference is due largely to the better maintenance that has been done during the past few years, and also to the campaign that has been going on among the operating men to reduce accidents and damage to the equipment. In addition to the passenger cars, 21 service and other cars were given general repairs and 33 were given light repairs during the year. Snow plows to the number of 26 were given general repairs and eight were given light repairs during the year. The maintenance of buses has now become a considerable part of the work, 144 going through the shops last year for general work. Ultimately it is planned to assemble all of the repair work at the Everett shops. At present, truck work and heavy machine work is done at the Albany Street shops. However, a large amount of miscellaneous work is handled at Everett. For instance, sign painting is one of the larger activities connected with car repairs. More than 20,000 curtain signs were changed or replaced last year, and in addition several thousand of miscellaneous signs were made or repaired. Doors and sash are manufactured in comparatively large quantities for replacements.

A detailed description of the Everett shops was published in Electric Railway Journal at the time of their completion, in the issues for Nov. 22, 1924, page 871; Dec. 13, 1924, page 989; Dec. 27, 1924, page 1065, and Jan. 31, 1925, page 173.

Seat cushions and backs, after removal, are placed in racks on trucks arranged to carry the entire set for one car, as indicated on the placard attached to the handle



Digitized by Google

LUBRICATING Car Apparatus

By

H. L. KAUFFMAN

Denver, Col.

Small electrical apparatus installed on cars requires proper lubrication no less than do the heavier items of equipment. Particularly careful attention should be paid to the lubrication of air compressors, door engines, motorman's valves, air-brake cylinders, foot valves, circuit breaker cylinders, brake hangers, brake-adjusting rods and other parts of brake rigging, center plates, trolley wheels and bases, as well as ball and roller bearings for motors and journals

AIR compressors on electric railway cars should be inspected at regular intervals. The oil-filling elbow of motor-driven air compressors is usually placed low on the side of the crank chamber near the motor. Its location is such that it serves also as an oil gage. The normal oil level should be approximately ⅛ in. below the top of the filling elbow. Whenever it has dropped to ⅜ in. below the top of the filling tube, new oil should be added. Under ordinary conditions new oil will be required only once in several inspections.

Oil around or near the safety drain indicates that the vent pipe requires immediate attention. In removing a vent pipe a socket wrench should be used in preference to a monkey wrench or an open-end wrench. When the vent pipe is put back into place, care should be taken to see that the pipe threads are well shellacked. The condition of the vent pipe can be determined by holding the hand under it. If no sign of air is issuing therefrom, the pipe is probably clogged with dirt; but if light puffs of air come out, it is clear. If the vent pipe is clogged, oil from the armature bearing cannot return to the chamber as it should, but will be discharged through the safety drain and wasted. Every effort, therefore, should be made to keep the vent pipe open. If a compressor is found with the vent pipe clogged, a notation should be made of this fact; then, if at the next regular inspection oil has reappeared on the compressor frame below the drain, the ½-in. plug at the bottom of the oil-return should be removed and the oil-return passage cleaned. The pipe plug at the bottom of the settling well should be removed once a year or oftener, and any sediment that may have collected drawn off.

By observing the following precautions in the care and operation of air compressors, satisfactory lubricating results should be obtained:

1. All oil passages should be kept clear to insure proper oil circulation.
2. Oil should be renewed periodically.
3. The outside of the compressor should be kept clean to aid cooling.
4. The suction air strainers should be kept clean to prevent entrance of dirt into the oil and to insure an unrestricted air flow. A plugged strainer may increase motor speed as much as 50 per cent above normal. This will cause the armature to throw oil through the breather pipes.

Lubrication of Door Engines

All working parts of door-engine valves are lubricated automatically. A semi-fluid grease, usually of the calcium-soap-containing type, is placed in the gear chamber of the engine works past the piston cups and into the free exhaust ports in the cylinder walls. Thereafter, the grease finds its way through the air passages and valve to the gear chamber. Thus a sufficient quantity of lubricant gets to the valve to keep the parts lubricated.

In selecting a lubricant for this purpose, the following points must be kept in mind:

1. The lubricant should not prove detrimental to the leather packings. Any grease containing rosin as a solidifier is highly injurious to leather.
2. The lubricant should be light enough to flow to all parts requiring lubrication, including the valves, and yet not be so "soupy" as to drip from the engine, such a condition—especially where the engine is located over the door—being apt to damage a passenger's clothes.
3. It should be a grease with practically no difference in consistency at temperatures of 0 and 100 deg., so that it will not become too thin in summer nor too hard in winter.
4. Exhausting of the compressed air in the gear cavity of the engine tends to atomize and carry away the liquid part of the lubricant. The lubricant, therefore, should be of such a nature that it mixes with the condensation of the exhaust, thus remaining soft and compensating in a great degree for the liquid part that is carried away by the exhaust. In other words, the grease must circulate with the air and motion of the piston to lubricate all parts regardless of temperature conditions, during which time it must retain a suitable consistency.
5. The grease should have good lubricating qualities.

One charge of grease in a door engine will last about a year, after which it will probably be found that a small

This is the fourth of a series of articles on lubrication. Articles in the Oct. 20, 1928, Nov. 17, 1928, and Jan. 19, 1929, issues of Electric Railway Journal discussed the kinds and grades of lubricants suitable for use on electric railway equipment, kind of waste preferable for use, how to saturate the waste with oil, modern practice in packing the "down-feed" motor, how modern-type motors are lubricated, modern bearing oiling devices, causes of bearing lubrication troubles, journal lubrication, linings and lining metals, re-babbitting bearings, and proper methods of lubricating gears and pinions.

Digitized by Google

quantity should be added. At the end of about the second year, the engine should be removed from the car, taken to a bench, dismantled, thoroughly cleaned, new piston cups installed and, if necessary, a new charge of grease put in the gear chamber. Likewise, at this time, the air strainer should be cleaned thoroughly and the pipes blown out before replacing the engine. The quantity of lubricant required varies with the different sizes of engines, but, ordinarily, it will be about 1 lb.

At the end of approximately each four or six months, a small quantity of graphite grease should be placed on the pins in the terminals; and about once a month the oil cavity in the slide block on the door slide should be filled with heavy oil. Where door engines are placed in a remote position or are so located that a mechanical control is not convenient, then a pneumatic valve puller, which is nothing more than an auxiliary cylinder, is generally employed. The cylinder walls of the pneumatic valve puller should be lubricated with a light oil, which is supplied through the forward supporting capscrew to a felt-wiping pad attached to the piston. Care should be taken to use an oil light enough in body to be absorbed by the felt and thus carried around the bore of the cylinder.

For the lubrication of the motorman's valve, air-brake cylinders, foot valves and circuit breaker cylinders, a semi-fluid grease like that used on door engines should be employed. These parts are dismantled whenever the equipment is being overhauled, at which periods it is advisable to coat the valve seats with grease. This same semi-fluid grease should also be placed in the cylinders, using an amount therein proportional to the dimensions. For valves, the lubricant must be so adhesive as to be able to resist the corrosive action of the air, in consequence of which it will continue to aid in the tight fit of the valve seats. It must not gum or undergo more than a slight change through the temperature range to which the equipment is subjected. For cylinders, it must retain a consistency that will insure its spreading. It must possess non-leaking qualities and must preserve the pliability of the leathers or cups without attacking them chemically.

Pressure Grease Best for Brake Rigging

On trucks equipped with half-ball brake hangers and brake-adjusting rods, modern practice consists in the use of Alemite fittings for lubrication purposes. Grease is the lubricant used. The fittings are installed at the center of the half-ball brake-hanger castings, so the grease will flow to each hanger. On the brake-adjusting rods, the fittings are installed over the threaded part of the castings. Advantages of this method of lubrication are that lubrication can be carried out easily and regularly when Alemite fittings are applied. Expensive castings have a longer life and there is a decrease in the noise from trucks. A considerable saving in time and labor results and adjustment is much easier. In many instances, the practice still consists in swabbing the moving parts with a black oil or slop oil, this being done frequently enough to insure positive operation.

Until a comparatively recent date satisfactory lubrication of center plates presented a difficult problem. Now, however, an oil-retaining center bearing is in use on most modern car trucks. A brass wear ring constantly in a bath of oil—with felt rings to keep out dust between the body and truck center plates—facilitates smooth and steady riding and lessens flange and rail wear at curves. Such an oil-retaining center bearing is refillable from inside the car through a pipe in the body bolster.

Recently a check made by an equipment manufacturer of the yearly total cost of harps and wheels on a number of properties showed that the expense for making replacements, inspections and oiling of old-style trolley wheels amounted to more than twice the cost of the wheels alone. These costs did not take into consideration the cost of excessive wear, due to chattering and arcing wheels, the damage to car roofs due to dripping oil, and many other incidental expenses.

Trolley Wheels Made Self-Lubricating by Means of Graphite Plugs

On a type of trolley wheel lately developed there is no expense whatever for oiling or greasing, lubrication being fully automatic throughout the life of the wheel. Three graphite plugs, each providing sufficient lubricant for at least 30,000 miles of service, are used in this type of trolley wheel and harp. These plugs are especially compounded for this service and provide complete lubrication, without attention. They are not affected by heat, moisture or current. These graphite plugs are inserted in the axle and pressed outwardly against the wheel bearing surface, each by means of a coiled spring—two of the plugs pressing against the bottom of the wheel bearing and one against the top. They are of sufficient size and are spaced closely enough to insure constant lubrication of the entire bearing surface.

On the older types of trolley wheels the slide under the trolley fork should be lubricated frequently with the same grade of oil as is used on air compressors. The same lubricant should be used on the hub, if solid, or a soft grease, if the hub is hollow.

In the modern trolley base two tapered roller bearings, working in renewable tapered bearing cups, support the base and give free lateral trolley pole movement. Perfect inclosure, with unusual accessibility, are advantages of late-design trolley bases. Both bearings are protected against dirt and weather by the turret housing, which fits closely over the stem casting. They are adjustable without removal of the housing.

Ample lubrication over long periods is provided by cup grease packed within the housing, which serves as an effective grease chamber. A leather cup washer below the bottom bearing acts as a seal and prevents the leakage of grease from the bearing. A removable pipe permits easy renewal of the lubricant by means of a grease gun. Thus the need for frequent lubrication, or even inspection, is eliminated. On the older types of trolley bases the same grade of oil as used on the air compressors, applied at frequent intervals, will give satisfactory results.

Car oil of the proper seasonal grade is suitable for use in roller-bearing journals which are fitted for oil lubrication. Motor bearings of the ball-bearing type are usually fitted for grease lubrication, in which case a neutral soft cup grease should be used. In summer, a grease of higher melting point than the one applied in winter should be employed. Where the bearing depends upon felt to retain the lubricant, difficulties are apt to be encountered; for, unless particular care be taken to keep the felt in the condition necessary to retain the grease, "grease-throwing" will result. Use of a cylinder-stock grease will do much to overcome this difficulty, in many cases, with such a grease, no further application of lubricant is required upon ball-bearing motors for three or four months.

Digitized by Google

Monthly and Other Financial Reports

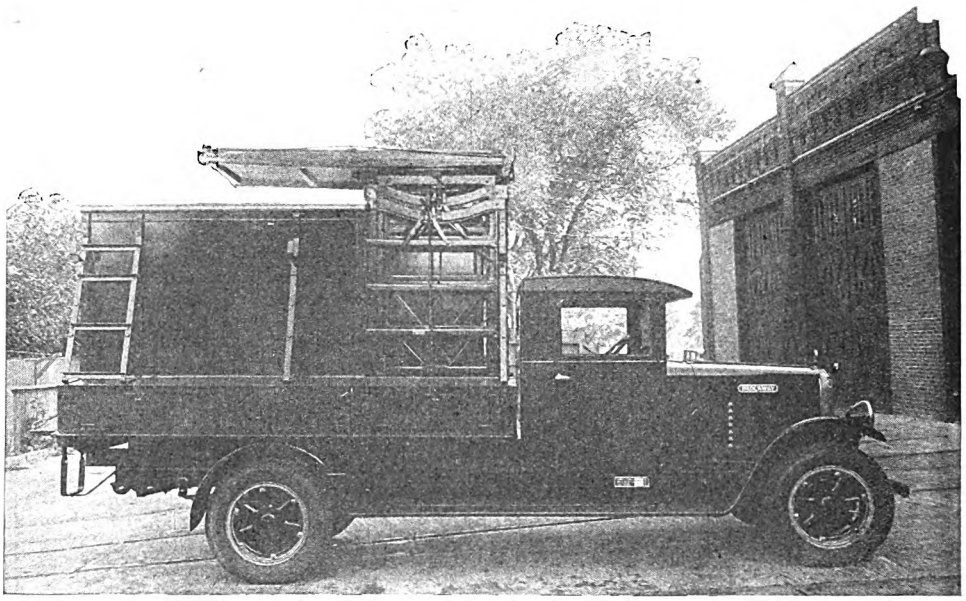
	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Denver Tramway Corporation, Denver, Colo.					
3 mo. end. Mar., 1930	1,060,205	727,162	123,083	221,804	96,149
3 mo. end. Mar., 1929	1,088,419	726,359	124,035	250,348	120,951
Capital Traction Co., Washington, D. C.					
March, 1930	353,563	252,484	27,385	75,219	45,692
March, 1929	385,572	257,297	29,101	101,079	72,088
3 mo. end. Mar., 1930	1,039,906	757,712	79,475	206,954	116,546
3 mo. end. Mar., 1929	1,071,395	757,297	82,405	236,423	147,935
Washington Railway & Electric Co., Washington, D. C.					
March, 1930	473,926	389,688*a*	.....	105,835	46,643
March, 1929	521,264	421,512*a*	.....	122,052	56,961
3 mo. end. Mar., 1930	1,399,414	1,147,387*a*	.....	252,027	.....
3 mo. end. Mar., 1929	1,458,169	1,206,050*a*	.....	252,119	.....
Jacksonville Traction Co., Jacksonville, Fla.					
March, 1930	95,864	71,829	9,248	13,998	.....
March, 1929	106,697	78,467	9,899	17,596	.....
12 mo. end. Mar., 1930	1,121,999	916,821	107,351	91,574	*65,995*
22 mo. end. Mar., 1929	1,187,402	959,261	107,224	114,445	*47,423*
Honolulu Rapid Transit Co., Honolulu, T. H.					
March, 1930	89,848	53,790	8,819	28,423	16,308
March, 1929	93,807	51,715	12,990	30,271	19,042
3 mo. end. Mar., 1930	259,325	160,079	26,458	76,161	40,393
3 mo. end. Mar., 1929	266,939	151,931	38,610	79,967	46,297
Chicago Surface Lines, Chicago, Ill.					
April, 1930	4,981,987	4,077,371*a*	.....	904,616	88,634
April, 1929	5,284,261	4,161,453*a*	.....	1,122,808	181,668
Duluth-Superior Traction Co., Duluth, Minn.					
3 mo. end. Mar., 1930	469,984	375,760	.....	94,224*e*	14,965
3 mo. end. Mar., 1929	516,197	415,662	.....	100,535*e*	20,421
3 mo. end. Mar., 1928	557,329	419,372	.....	137,957*e*	50,313
3 mo. end. Mar., 1927	567,240	421,877	.....	145,363*e*	62,002
Boston Elevated Railway, Boston, Mass.					
March, 1930	2,987,744	1,988,413	135,158	871,989	178,957
March, 1929	3,133,633	2,047,100	147,115	943,930	245,409
Eastern Massachusetts Street Railway, Boston, Mass.					
March, 1930	711,460	449,064	30,585	240,849	159,907
March, 1929	729,038	449,053	36,485	321,785	229,980
3 mo. end. Mar., 1930	2,154,889	1,315,839	97,431	770,407	527,497
3 mo. end. Mar., 1929	2,315,310	1,377,799	104,898	880,389	602,477
Greenfield & Montague Transportation Area, Greenfield, Mass.					
3 mo. end. Mar., 1930	21,860	16,848	.....	5,011	.....
Springfield Street Railway, Springfield, Mass.					
3 mo. end. Mar., 1930	677,390	485,239	8,972	101,451	81,727
3 mo. end. Mar., 1929	729,746	529,492	10,143	101,928	88,191
Kansas City Public Service Co., Kansas City, Mo.					
March, 1930	736,416	555,535	41,675	139,205	63,427
March, 1929	798,223	606,734*a*	.....	191,489	126,349
3 mo. end. Mar., 1930	2,187,525	1,693,856	125,025	368,643	143,658
3 mo. end. Mar., 1929	2,319,597	1,879,448*a*	.....	440,148	248,297
Illinois Terminal Company, St. Louis, Mo.					
February, 1930	529,212	379,519	24,000	125,693	82,514*d*
February, 1929	556,441	446,609	21,262	88,467	43,477*d*
2 mo. end. Feb., 1930.	1,106,604	801,450	48,000	257,154	166,740*d*
2 mo. end. Feb., 1929.	1,181,631	871,357	42,524	267,627	178,780*d*
Illinois Terminal Company, St. Louis, Mo.					
March, 1930	579,969	400,086	24,000	150,883	111,120*d*
March, 1929	601,931	409,687	21,262	170,981	138,939*d*
3 mo. end. Mar., 1930	1,681,572	1,201,536	72,000	408,036	277,858*d*
3 mo. end. Mar., 1929	1,783,562	1,281,044	63,786	438,608	317,719*d*
International Railway, Buffalo, N. Y.					
3 mo. end. Mar., 1930	2,588,351	2,219,557*a*	.....	391,370	73,881
3 mo. end. Mar., 1929	2,727,178	2,283,963*a*	.....	459,885	133,821
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
March, 1930	81,589	64,527	4,800	17,229	*13,265*
March, 1929	89,181	63,507	7,840	20,115	*11,797*
3 mo. end. Mar., 1930	261,724	195,350	14,400	67,905	*24,917*
3 mo. end. Mar., 1929	263,548	188,997	23,520	58,473	*36,454*
Brooklyn-Manhattan Transit System, New York, N. Y.					
April, 1930	5,074,571	3,235,271	343,536	1,569,249	802,168
April, 1929	4,096,664	2,611,610	289,188	1,270,682	530,727
10 mo. end. Apr., 1930.	50,401,124	33,304,266	3,290,997	14,533,464	6,788,340
10 mo. end. Apr., 1929.	40,120,188	25,866,115	2,800,937	12,299,400	5,228,402
Brooklyn & Queens Transit System, New York, N. Y.					
April, 1930	1,936,880	1,529,944	114,126	318,161	195,127
April, 1929	2,000,676	1,674,860	103,386	245,058	119,267
10 mo. end. Apr., 1930.	19,589,976	15,408,223	1,147,861	3,249,387	1,995,199
10 mo. end. Apr., 1929.	19,952,805	16,555,514	1,070,649	2,543,146	1,260,056
Hudson & Manhattan Railroad, New York, N. Y.					
April, 1930	1,063,729	515,470*a*	.....	548,259	213,380
April, 1929	1,065,969	533,954*a*	.....	532,015	192,655
4 mo. end. Apr., 1930.	4,222,990	2,096,432*a*	.....	2,126,558	788,092
4 mo. end. Apr., 1929.	4,210,611	2,127,889*a*	.....	2,082,722	739,383
Interborough Rapid Transit Co., New York, N. Y.					
March, 1930	6,436,421	3,902,136	262,623	1,178,440	*199,385c*
March, 1929	6,283,363	3,595,957	204,197	2,056,916	682,255
9 mo. end. Mar., 1930	54,351,905	33,813,718	1,877,425	10,748,163	*1,630,650c*
9 mo. end. Mar., 1929	51,596,671	31,789,328	1,807,718	14,198,969	1,803,917
Long Island Railroad, New York, N. Y.					
February, 1930	2,766,934	2,178,709	104,138	483,477	345,317*d*
February, 1929	2,758,438	2,109,666	96,141	551,998	420,935*d*
2 mo. end. Feb., 1930.	5,696,187	4,525,608	203,510	966,359	686,943*d*
2 mo. end. Feb., 1929.	5,662,862	4,374,014	187,899	1,096,971	830,634*d*
Long Island Railroad, New York, N. Y.					
March, 1930	2,958,720	2,332,082	123,435	501,962	360,645*d*
March, 1929	3,043,395	2,307,337	113,967	616,970	477,557*d*
3 mo. end. Mar., 1930	8,654,907	6,857,690	326,945	1,468,321	1,047,588*d*
3 mo. end. Mar., 1929	8,706,257	6,681,351	301,866	1,713,941	1,308,191*d*
New York Railways, New York, N. Y.					
March, 1930	420,100	427,031*a*	.....	*6,931*	*27,246b*
March, 1929	490,200	470,003*a*	.....	20,197	*1,255b*
3 mo. end. Mar., 1930	1,218,025	1,244,561*a*	.....	*26,536*	*101,442b*
3 mo. end. Mar., 1929	1,358,860	1,350,066*a*	.....	8,794	*69,405b*
New York, Westchester & Boston Ry., New York, N. Y.					
March, 1930	208,434	114,670	24,832	69,926	*157,515*
March, 1929	199,071	125,717	19,824	54,234	*158,014*
3 mo. end. Mar., 1930	609,552	347,156	73,856	190,806	*495,776*
3 mo. end. Mar., 1929	563,456	378,052	58,304	129,149	*499,719*
Staten Island Rapid Transit Co., New York, N. Y.					
February, 1930	186,727	139,489	17,500	29,738	33,055*d*
February, 1929	213,270	160,782	18,000	34,485	*3,072d*
2 mo. end. Feb., 1930.	375,104	291,738	35,000	48,336	42,934*d*
2 mo. end. Feb., 1929.	441,421	336,991	37,000	67,422	*4,854d*
Staten Island Rapid Transit Co., New York, N. Y.					
March, 1930	188,807	154,981	17,500	14,784	*6,205d*
March, 1929	247,109	174,591	18,000	54,518	17,126*d*
3 mo. end. Mar., 1930	563,911	446,719	52,500	63,150	36,729*d*
3 mo. end. Mar., 1929	688,530	511,582	55,000	121,940	12,272*d*
Third Avenue Railway, New York, N. Y.					
March, 1930	1,252,562	958,150	90,147	222,006	*8,270*
March, 1929	1,347,229	1,021,953	91,710	256,169	*6,738*
9 mo. end. Mar., 1930	11,317,336	8,738,310	800,383	1,953,060	*315,333*
9 mo. end. Mar., 1929	11,571,009	8,956,387	816,731	1,986,722	*313,982*
New York State Railways, Rochester, N. Y.					
3 mo. end. Dec., 1929.	2,267,725	2,083,476*a*	.....	184,249	*165,346*
3 mo. end. Dec., 1928.	2,395,029	2,339,016*a*	.....	56,013	*320,152*
Philadelphia & Western Railway, Norristown, Pa.					
March, 1930	59,706	54,368*g*	.....	.....	5,338
March, 1929	67,652	55,907*g*	.....	.....	11,745
3 mo. end. Mar., 1930	174,948	158,601*g*	.....	.....	16,347
3 mo. end. Mar., 1929	191,494	161,803*g*	.....	.....	29,691
York Railways, York, Pa.					
3 mo. end. Mar., 1930	805,906	504,926*g*	.....	.....	300,980*f*
3 mo. end. Mar., 1929	763,816	463,308*g*	.....	.....	300,508*f*
12 mo. end. Mar., 1930	2,883,040	1,932,878*g*	.....	.....	950,162*f*
12 mo. end. Mar., 1929	2,706,151	1,776,808*g*	.....	.....	929,343*f*
Galveston-Houston Electric Railway, Houston, Texas					
March, 1930	42,390	26,350	2,606	13,429	.....
March, 1929	49,771	28,292	2,565	18,912	.....
12 mo. end. Mar., 1930	565,531	322,915	32,517	210,290	*59,154*
12 mo. end. Mar., 1929	629,788	354,593	31,705	243,488	*27,214*
Houston Electric Co., Houston, Texas					
March, 1930	274,515	172,307	22,502	79,704	.....
March, 1929	299,280	179,185	24,582	95,911	.....
12 mo. end. Mar., 1930	3,336,205	2,069,787	267,039	1,017,625	623,313
12 mo. end. Mar., 1929	3,368,704	2,088,441	288,870	991,392	580,831
Pacific Northwest Traction Co., Seattle, Wash.					
March, 1930	77,748	59,130	4,451	14,165	.....
March, 1929	72,952	60,404	4,366	8,180	.....
12 mo. end. Mar., 1930	983,795	709,670	54,964	219,160	103,770
12 mo. end. Mar., 1929	883,769	746,547	51,456	85,764	*51,629*
Edmonton Radial Railway, Edmonton, Alta.					
March, 1930	77,239	47,472	.....	29,766	2,539
March, 1929	77,957	45,541	.....	32,416	5,068
3 mo. end. Mar., 1930	238,390	146,412	.....	91,978	7,638
3 mo. end. Mar., 1929	234,049	135,143	.....	98,906	13,862
Lethbridge Municipal Railway, Letherbridge, Alta.					
2 mo. end. Feb., 1930	10,256	8,264	.....	1,992	*3,179*
2 mo. end. Feb., 1929	.....	.....	.....	.....	*2,456*
Guelph Radial Railway, Guelph, Ont.					
3 mo. end. Jan., 1930	25,720	21,093	259	4,368	*4,757*
3 mo. end. Jan., 1929	.....	.....	.....	.....	*5,894*
Regina Municipal Railway, Regina, Sask.					
2 mo. end. Feb., 1930	87,637	55,542	.....	31,825	7,697
2 mo. end. Feb., 1929	.....	.....	.....	.....	12,968
Havana Electric Railway, Havana, Cuba					
3 mo. end. Mar., 1930	1,356,063	1,148,840*a*	.....	213,227	53,642
3 mo. end. Mar., 1929	1,377,748	1,124,020*a*	.....	260,892	99,919
3 mo. end. Mar., 1928	1,367,984	1,162,432*a*	.....	218,098	57,134

a Includes taxes. *b* Before adjustment bond interest. *c* After paying rentals on city-owned subways. *d* Net after rents. *e* Before taxes. *f* Before depreciation. *g* Including operating expenses, taxes and income deductions.

Digitized by Google

Equipment for Overhead Maintenance Modernized on Eastern Massachusetts

Twenty new tower trucks have been purchased and equipped for maintenance work on either overhead line or underground cable jobs. Each operating district is equipped with one or more standard units



Maximum width was specified for the heavier type Mack and Brockway trucks so that adequate lockers and inside body space might be obtained

IN ORDER to permit more efficient and economical maintenance of overhead lines and underground cables along its 585 miles of track, the Eastern Massachusetts Street Railway has purchased and specially equipped twenty new motor line trucks. The vehicles were designed so as to give each of the twelve operating divisions at least one universal truck that could be used for all kinds of line work in that division rather than to have a number of different types of trucks which operated in all divisions.

The equipment consists of eight 2-ton Macks, ten 1¼-ton Brockways and two 1-ton Fords. The 1¼-ton capacity trucks are designed for so-called emergency service and to serve as auxiliaries for the heavier wire and cable work. The 2-ton power trucks are for use on heavy construction work such as setting poles, running feeder and trolley wire, while the light 1-ton unit is used as auxiliary equipment in two of the districts. Both the 1¼-ton and 2-ton units have the same general design for tower and body except in respect to weight and size. The bodies were built by the J. R. McCardell Company, Plymetl being used for the sides.

In building the new vehicles it was thought desirable to increase the width over that of the trucks previously used; in fact, the new trucks are very close to the statute limit for the width of vehicles in the state of Massachusetts. This was done to make available a large amount of room for locker space, leaving the inclosed portion of the body clear for other operations such as loading trolley wheels, running trolley wire and temporary loading with heavy construction material.

In order to obtain the required operating height of 18 ft. from ground to platform, it was considered necessary to have a three-section tower. The problem was to build this kind of tower and place it on the truck so as to retain for other uses the space inside the corners of the tower. To accomplish this, it was necessary to recess the body so that the tower would come entirely inside of the back line of he locker space and at the same time not foul the body sides. This was accomplished by an arrangement whereby the body is reinforced by the tower and the tower is braced by the body. At the same time a large available space inside of the tower was retained for storage of tools and equipment.

Each of the 2-ton trucks is equipped with a power winch for general use. The winch is so arranged that by use of suitable sheaves, built into the body, it may be used for loading, pulling cable, or for operating a pole-

Three-section tower for Eastern Massachusetts Street Railway was so designed that the body would be reinforced by the tower and the tower braced by the body

Digitized by Google

The open-type, light-weight Ford units are used as auxiliary equipment in two divisions

setting derrick. Because of the built-in body, the standard arrangement for the pole derrick could not be used, therefore a modified design was employed so that the stiff leg and sheaves at the top of the derrick come outside of the right-hand side line of the built-in body. The winches used are Mead-Morrison No. 908, mounted on the rear right-hand side so that the niggerhead can be pulled outside of the body line when in use and when not in use can be pushed back inside of the body line and there secured out of the way.

The bodies were built according to the railway's specifications, the principal dimensions being as follows:

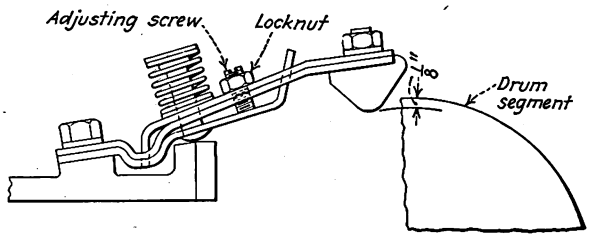
General Dimensions of New Tower Trucks

	Mack	Brockway
Over-all length of body platform	12 ft. 0 in.	10 ft. 0 in.
Over-all width of body platform	7 ft. 4 in.	6 ft. 4 in.
Width of body inside, in the clear	4 ft. 4 in.	3 ft. 6 in.
Over-all width of tower frame	4 ft. 7 in.	3 ft. 5⅛ in.
Over-all length of tower frame	4 ft. 3½ in.	3 ft. 3 in.
Height of body inside at center	5 ft. 8 in.	5 ft. 3½ in.
Over-all length of main body	7 ft. 6¼ in.	6 ft. 7 in.
Length of body section under tower, approximately	3 ft. 7½ in.	2 ft. 5 in.

Installation and Adjustment of Compensating Controller Fingers

By G. L. Moses
Renewal Parts Engineering Department
Westinghouse Electric & Manufacturing Company

When compensating fingers are used on the controller, the adjusting screw should be set to give a ⅛-in. lift from the free position when the finger tip is on the drum segment. This lift should be measured from the true surface of the drum and not from the worn or burned arcing tips or segments. It is desirable in order to obtain the full advantages of the improved fingers, to install new contact segments when applying new fingers. The adjusting screw should always be secured with the locknut after adjustment. An inspection should be made after installation to see that the fingers



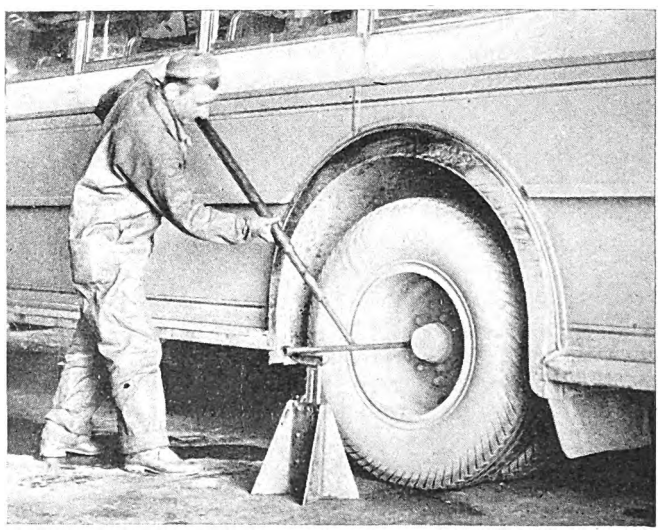
Adjusting screw of compensating controller finger should be set to give ⅛-in. lift from free position

are not forced to the limit of their travel at any position as the drum is rotated. This can be checked by observing if the finger can be lifted off its operating position on the segment. The lift should be checked at each position where a finger rises on a drum segment when the drum is rotated in either direction. When the fingers are properly installed and adjusted, "compensating" action will be obtained which results in full line contact. As the finger tips and drum segments wear, adjustment should be made to maintain the recommended ⅛ in. lift. Proper adjustment of the finger will insure long life and satisfactory operation and eliminate stubbing.

Wrench for Wheel Nuts*

By Jack Kehoe
Foreman St. Clair Garage
Cleveland Railway

In order to tighten or loosen wheel nuts on buses of the Cleveland Railway, a Tee wrench with a 4-ft. handle has been developed. As ordinary steel forgings were thought not to have sufficient strength to stand up under this kind of work, alloy steel was used for the head of the wrench. This was made by a local wrench manufacturer. At one end of the cross member is a large hexagonal socket for the outer wheel nut and at the

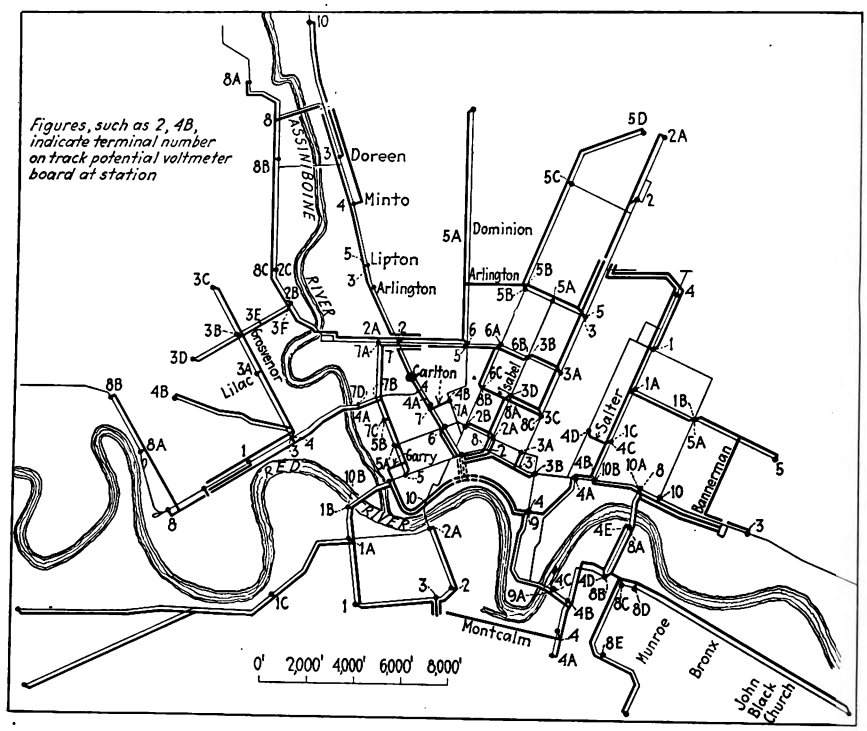


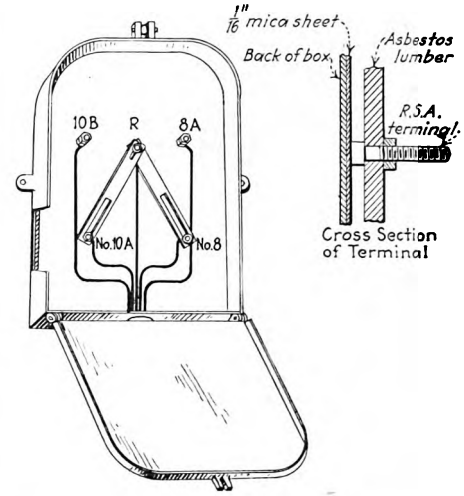
Alloy steel Tee wrench developed for tightening or removing wheel nuts on buses of the Cleveland Railway

other a square socket for the cap nut. These are standard heavy duty sockets of alloy steel welded to a cross bar of the same material. The head of the wrench is provided with a 10-in. handle arranged to receive a long pipe handle. In shop service the pipe handle is welded to the head of the wrench but for emergency cars and portable tool sockets, the pipe handle is detachable.

**Submitted in* Electric Railway Journal *Prize Contest.*

Digitized by Google





The wire terminates in switch boxes with convenient terminals and connectors which facilitate any desired arrangement of circuits

At left — Permanent track potential wires have been installed all over the city of Winnipeg to facilitate the making of electrolysis voltage tests

Potential Wires Check Electrolysis

By H. G. Stewart
Superintendent Railway Distribution
Winnipeg Electric Company

COMPLYING with what is known as the electrolysis act, which was passed some time ago by the Manitoba Legislature, the Winnipeg Electric Company has installed 223,000 ft. of No. 8 twin-braided, waterproof wire. These lines cover the entire railway system for the purpose of checking potentials between various points on the tracks.

In order to facilitate periodic testing of track potentials the wires, which in general parallel the track system, are arranged with rail taps and switches mounted on adjacent poles. It is possible to record tests from any railway substation to any point on the track or between any two points on the track.

In each substation the wires terminate on special switchboard panels which are equipped with recording voltmeters of the smoked-chart type, having ranges of 25-0-25 volts, 5-0-5 volts, 0.5-0-0.5 volts. In making a test, before a recording voltmeter is connected in circuit, the lines to be used are checked to prove that they are free of open circuits or accidental grounds by talking over the line at both ends through the rail using telephone headsets in series with three or four dry cells.

The relation of the track system and the potential wires, switchboard designations and distance in feet between rail taps, is shown in the map. Permanent rail connections are made by placing a No. 9 wire in a ½-in. conduit extending from the rail to the pole, and up the pole a distance of 8 ft. The wire is connected to the rail by soldering to a short length of 0000 cable, which in turn is welded electrically to the rail.

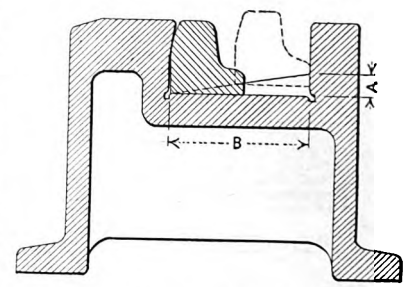
For the convenience of the testers, a complete list of the locations of test points has been made in booklet form. This gives the number of the test points, the street location, and the distance in feet between the points and the rail nearest the substation. The arrangement of switch boxes at each location is also shown.

In the original installation, the test switches consisted of 30-amp. battery switches, but it was found that these soon became defective. Since the tests were not dependable, a special arrangement of terminals was made. This is shown in the small diagram.

Raised Toe Tongue Switch*

By E. B. Spenzer
Special Work Engineer Way Department Cleveland Railway

TO OVERCOME tread wear on the toe of a tongue switch due to straight operation which reduces the guard action of the tongue when the curve is used, the Cleveland Railway inserts beveled risers in the bed of the switch. The bevel on these risers raises the tongue ⅜ in., when set for the curve run, and permits it to rest level with the tread, when set for the straight run. Around in the base of the tongue are two slots with the same bevel as the risers in order to have full bearing when the wheels pass over it on the straight run. This method of raising the tongue has not only reduced the number of derailments and accidents, but has also reduced the number of tongue renewals.



Beveled risers are placed at toe of tongue switches by Cleveland Railway to raise tongue for curve operation

In some locations where the mate and part of the outside curve and approach rails are lower than the switch, due to existing pavement and street grades, these tongue switches are bought from the manufacturer with the risers already built in.

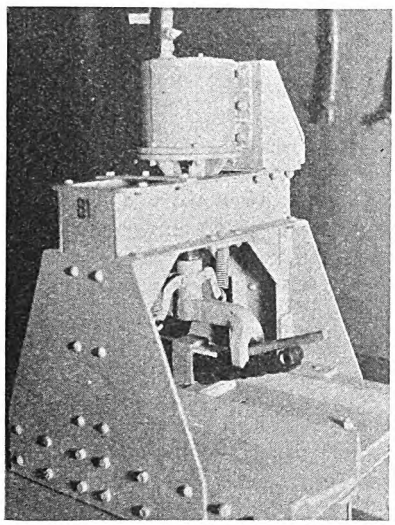
**Submitted in* Electric Railway Journal *Prize Contest.*

Digitized by Google

Truck Springs Assembled by Pneumatic Machine*

By Hans Korn
Chief Engineer Hamburg Elevated Railway
Hamburg, Germany

ASSEMBLING the leaves of truck springs is done in the shops of the Hamburg Elevated Railway, Hamburg, Germany, by means of a pneumatic machine. This apparatus presses the leaves tightly together and thus facilitates the mounting of clips and straps. The device consists of a framework and a steel claw attached to the lower end of the piston of an air-brake cylinder. When air is admitted the claw moves downward and presses the leaves together thus permitting the mechanic to install the straps and clips. Much time has been saved by the use of this apparatus instead of doing the work by hand.



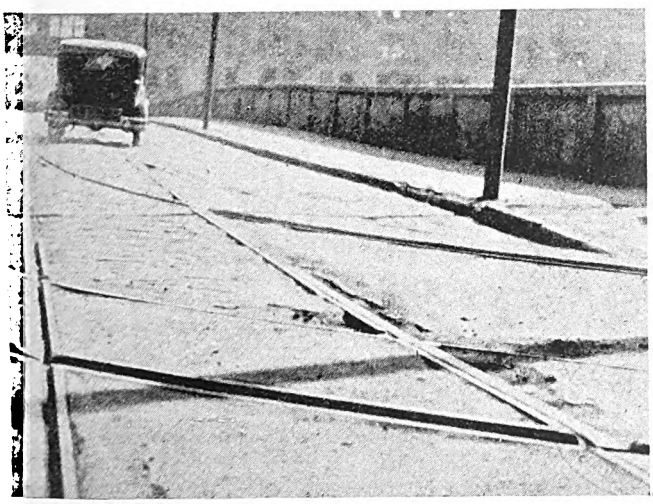
Pneumatic machine used at Hamburg, Germany, in assembling the leaves of truck springs

Emergency Special Work Built in Place*

By W. S. Yeates
Georgia Power Company, Atlanta, Ga.

WHEN a bridge on one of Atlanta's main thoroughfares was condemned and closed to traffic with only a few days' notice, pending construction of a new bridge, it was necessary to reroute two important car lines of the Georgia Power Company that ran over the bridge. To do this without interruption of service it was necessary to build a block of double track and change a double-track curve into a double-track branchoff in order to reach another bridge nearby.

Suitable second-hand switches, mates and frogs were found, but it was necessary to build the curved crossing. As surveying, laying out and constructing the piece of special work would have taken too much time, it was decided to build the crossing in place, using Thermit welding. The gage lines of the straight track were marked on the curved rails in place and flangeways for the straight line cut through. Rails for the straight track were cut to length, the ends shaped, the pieces spiked in position and welded with thermit. The result was a crossing with no internal joints which has been entirely satisfactory for two years.

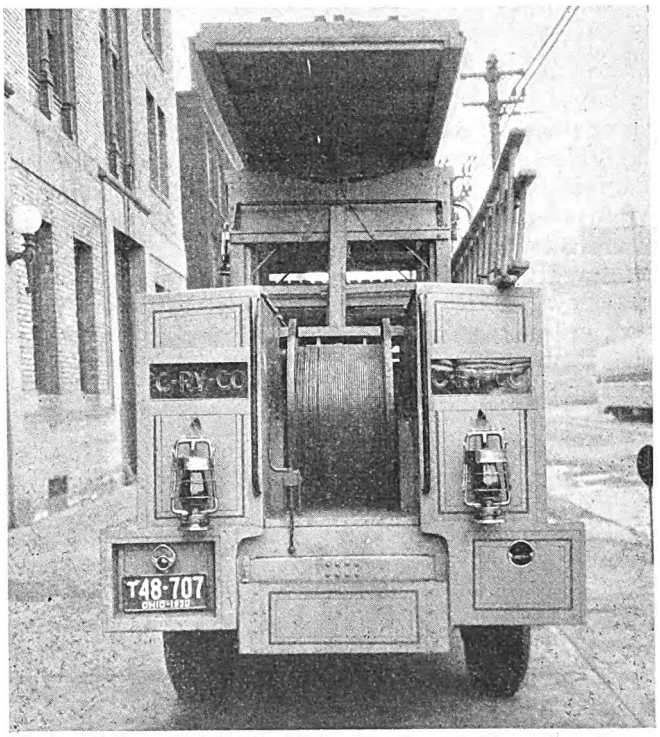


This emergency double-track branch off was made in place in Atlanta with Thermit welding

*Submitted in Electric Railway Journal Prize Contest.

Warning Lights on Tower Wagons*

By Angus G. Scott
Assistant Superintendent of Overhead Lines
Cleveland Railway

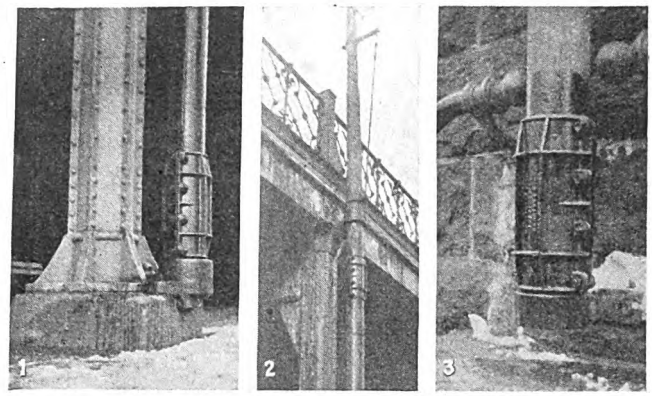


Neon-tube warning lights on rear of line trucks of the Cleveland Railway

BECAUSE of the increasing amount of line maintenance work being done at night in heavy traffic areas, a new tail-light has been designed for the rear of Cleveland Railway line division trucks. This tail-light is a red, neon-gas sign which reads "C. RY. CO." It is about 18 in. long with letters approximately 4 in. high. The neon tubes, well padded with rubber to prevent breakage due to vibration, are protected with a triplex glass plate. They are lighted from the ordinary 6-volt truck battery and a high frequency coil; the latter apparatus being furnished by the sign manufacturers. The light can be seen much farther than the ordinary tail light and stands out boldly in misty weather. It adds appreciably to the safety of the men working on the tower of the truck and is expected to prevent rear end collisions.

Digitized by Google

Reinforcing Corroded Poles



Method of Reinforcing Poles on Bridge

1. Base of pole reinforced with malleable iron ground line reinforcing clamp.
2. A section was cut out of the pole to remove corroded portion and a splice made with malleable iron clamp.
3. Repair of corroded pole against stone abutment.

REPAIRS of an unusual nature were made recently to a number of poles on the Third Avenue Railway on a bridge over the Harlem River in New York City. These poles are erected alongside the columns supporting the bridge and are held in place by brackets attached to the foundation and to the caps heading the columns. After many years use the poles had corroded badly where they passed through these brackets and it was necessary to repair them or to replace them entirely.

Removal of the poles by cutting off the brackets, substituting new poles and rewelding the brackets in place was considered. Another method was tried, however, and has proved very satisfactory. The pole was loosened in the bracket attached to the cap on the column, and then cut off at the point of corrosion for about 6 in., the upper portion being dropped through the bracket so that a sound portion passed through the bracket and provided bearing surface. The pole was then spliced with a malleable iron reinforcing clamp.

At the bottom of the pole corrosion had occurred a few inches above the point where it fitted into the cup in the bracket. This portion of the pole was reinforced with a similar clamp attached immediately above the bracket. Where the poles were erected against stone abutments of the bridge a similar method was used with a different bracket supporting the pole.

Washing Buses in Record Time*

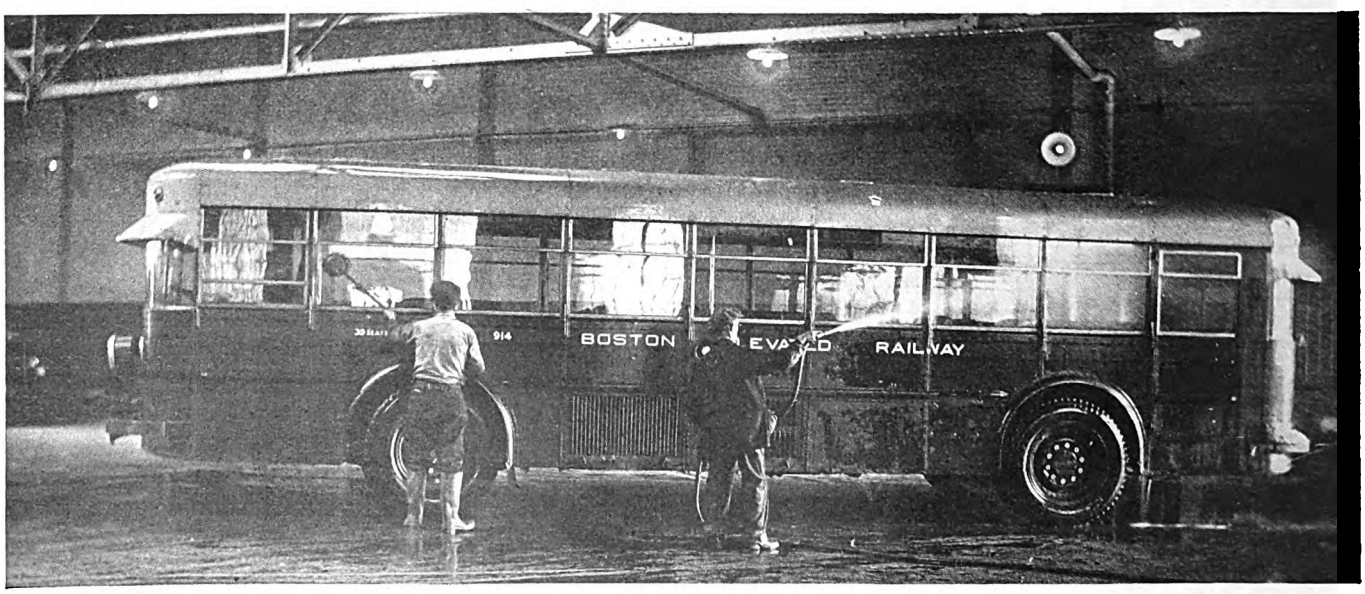
By D. S. MacKay
Supervisor of Automotive Equipment
Boston Elevated Railway

CLEAN buses are considered an asset by the Boston Elevated Railway. To keep them in this condition, a plan has been worked out that has been quite successful. Rain or shine, every bus returning to the garage after the morning rush is met as it enters the garage by two hosemen and two or three scrubmen. A man with a hose with an ordinary nozzle stands on each side of the bus and wets the entire surface. Then two men with ordinary scrub brushes rub the wet surface, including the glass. They use no water other than that left by the hose. After the scrubbing, water from the hose is again sprayed over the bus. In 1½ minutes the bus is on its way to its berth and the next bus is in place for washing.

Not all buses return to the garage after the morning rush, but schedules are made so that none goes without washing for more than three days, while some are washed every morning. With this frequency of washing, dirt does not build up on the surface, and what does collect is removed easily by the periodical cleaning every 2,000 miles, or once about every 22 days. This work is done with a paste cleaner which is wiped off with a rag without the need for water. This cleaning follows the morning washing and is done by the same men. For periodical cleaning, 75 man-minutes are required to do the outside and 90 man-minutes to do the inside.

Buses which have been out of the shop for two or three years compare favorably with those on the road only two or three months after painting. The new system has made a great improvement in the appearance of the buses and was inaugurated with practically no increase in expense. The time for the washing has been cut and more time left for the periodical cleaning.

**Submitted in* Electric Railway Journal *Prize Contest.*



Two men with hose and two with scrub brushes clean each bus in 1½ minutes in the Boston Elevated garages

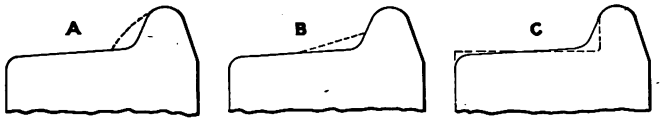
Digitized by Google

Grinding of Wheels Makes Maintenance Economical*

By J. B. Freeman
Dallas Railway & Terminal Company

GRINDING of car wheels to restore the contour before the wear has been so great that turning or welding are necessary has proved an economy of considerable value in Dallas. The work is done with a pit grinder, and the wheels are not removed from the car.

After running 15,000 to 30,000 miles, the flange on one wheel becomes thicker, and that on its mate begins to wear sharp. This occurs in one of two ways, as shown



Typical contours of wheels after service on Dallas street cars

in the illustration. *A* and *B* represent two types of flanges that have become thicker, while *C* is typical of the opposite wheel, which has worn sharp. It will be found that the circumference of wheels *A* or *B* will be larger than that of wheel *C*.

Since wheels vary in size and contour, it is not possible to give definite figures for directing the grinding. To restore a wheel such as *C* it is only necessary to taper the tread, grinding away very little of it. None of the flange is ground away in a wheel such as *A*. The tread is ground down until it measures $\frac{1}{8}$ in. to $\frac{1}{4}$ in. less in circumference than wheel *C*. In grinding the type of wheel represented by *B* it is necessary to establish a wide gage line bearing a fillet whose width is determined by the amount worn from wheel *C*. The tread is ground down until it measures $\frac{1}{8}$ in. to $\frac{1}{4}$ in. smaller in circumference than wheel *C*. This fillet will roll up to the flange by the time the wheel has run 10,000 miles, and the flange then will resemble that of Fig. A. The slight difference in circumference will cause the wheel with the large flange to hug the gage line and equalize the wear. This grinding is done in the pit without removing the wheels, the machine being operated by one man. Flanges are being maintained by him on practically all the wheels of the 314 cars operated by the Dallas Railway & Terminal Company.

This system of equalizing wheel wear has been in use since January, 1929, after a series of experiments lasting about a year. We are getting 20,000 to 33,000 miles between grindings. On a 26-in. wheel three or four grindings will be needed for a life of 100,000 miles or more.

The cost of four grindings, including labor, electricity, oil, etc., is $7 per wheel or less. It saves 75 per cent of the wheels from being welded, and with experience a further reduction of flange welding is anticipated.

The cost of three weldings and finishings of a wheel, as given in the report of A.E.R.E.A. Rolling Stock Committee No. 10 on welding of wheel flanges, is $9.96. We find that three weldings of a flange are necessary during the life of 100,000 miles. The cost of removing and installing a wheel three times is $3.36, making a total cost of $13.32 for welding during the life of a wheel. Hence when a wheel can be maintained by grinding alone there is a saving of $6.32 per wheel.

Some of our wheels already have run 60,000 miles without being welded, and indications are that they will wear out without welding. It appears that there will be an increase of 20,000 miles in average wheel life, since there is very little waste of tread in grinding.

*Submitted in Electric Railway Journal *Prize Contest.*

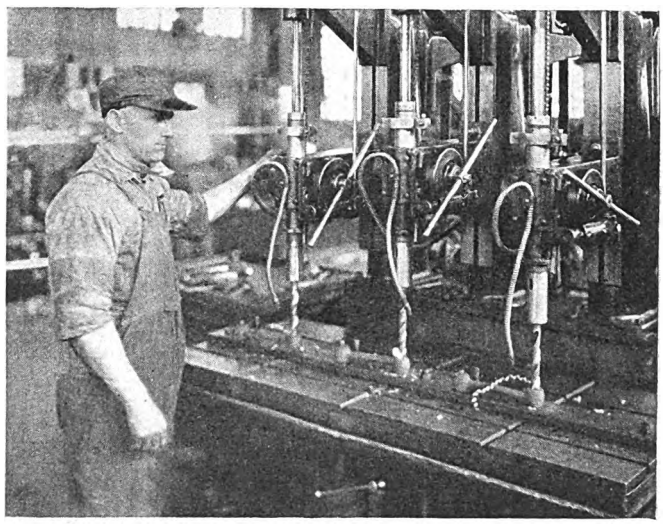
Installing Safety Zone Markers*

By W. P. Davis
Roadmaster United Railways & Electric Company
Baltimore, Md.

WHERE granite block paving is used, the installation of metal disks for marking safety zones on the street presents a problem on account of the necessity of drilling the blocks to receive the holding device. Usually there are only a few disks to be put down at a time and the job does not warrant the use of an air drill and its accompanying apparatus. In order to avoid the necessity for drilling by hand, which is a rather slow tedious process, the United Railways & Electric Company of Baltimore selects blocks of similar size to those in use in the street and drills them in the yard, where compressed air is constantly available. The metal disks are installed there. The blocks in the street where the disks are to go are removed and those with the disks attached are substituted.

Jig for Drilling Brake Hangers*

By Terence Scullin
Superintendent Equipment and Buildings
Cleveland Railway



Jig used in shops of Cleveland Railway permits continuous drilling of brake hangers

DRILLING of brake hangers has been expedited in the Harvard Shops of the Cleveland Railway by use of a special jig. This consists of a steel plate with a number of vertical posts which hold three brake hangers in position, each under a drill press. The method of operation is to start one drill to work on the right-hand hanger and then to start the second and third drills in succession. By the time the operator has started the third drill the first has completed its work and the hanger is ready for removal. Thus the process is practically continuous and one man is able to drill many more hangers than was possible with the old equipment.

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Springfield, Mass. — The Springfield Street Railway will operate its Westfield line on a one-man car basis beginning May 25. This will establish the Springfield system on a 100 per cent one-man basis.

✦

Seattle, Wash. — Extension of the Beacon Hill car line of the Municipal Railway from West Spokane Street to Graham Street is authorized by a bill introduced in the City Council. To finance the project, the bill authorizes issuance of $56,000 in railway bonds. The proposed extension almost 2 miles long would be single track.

✦

Boston, Mass.—At a meeting of directors of Engineers Public Service Company, Matthew C. Brush, president of the American International Corporation, was elected to the board to fill the vacancy caused by the death of Dr. Arthur T. Hadley.

✦

Philadelphia, Pa.—The Reading Company has expanded its electrification program to include the Doylestown branch of the railroad and has appropriated $300,000 for the purpose, bringing the total electrification budget of the system to $20,300,000.

✦

Lansing, Mich.—Following the first of a series of rate hearings, Robert H. Dunn, chairman of Public Utilities Commission, said operators of bus lines in Michigan have agreed to establish a system of through fares over connecting lines.

✦

Harrisburg, Pa.—Substitution of bus for street car service between Mechanicsburg and Carlisle is proposed by the Valley Railways in petitions which were heard on May 22 by the Public Service Commission.

✦

Boston, Mass.—The Boston Elevated Railway will operate the night service between Market and Washington Streets, Cambridge, and Scollay Square in part by bus and in part by street car.

✦

Toronto, Ont.—The four municipalities of North York, Richmond Hill, Vaughan and Markham have voted to retain the services of the Metropolitan Radial Line, and, as a result, the joint Municipal Councils will proceed with negotiations to purchase the line from the City of Toronto at a price of $75,000.

✦

Washington, D. C.—The long pending merger bill, giving the assent of Congress to the coalition of "street railway corporations operating in the District of Columbia," finally has received a favorable report by the Senate District Committee. It is stipulated the unification agreement shall be subject to ratificaion by the majority stockholders of the companies. A similar merger bill is before the House District Committee.

(*Late News Continued on Page* 343)

United States Supreme Court Decides Columbia Case

Railway Service Ordered to Be Continued in South Carolina City Subject to Action to Determine a Proper Return

IN A decision handed down on May 19, the United States Supreme Court denied the right of the Broad River Power Company to suspend railway operation in Columbia, S. C. This ruling sustains an order of the South Carolina Supreme Court directing the Broad River Power Company and its subsidiary, the Columbia Railway Gas & Electric Company, to resume operation of the abandoned service.

The opinion rendered by the Supreme Court on the case held the corporate history of the company to be of paramount importance in determining whether or not operation of the service can be required. It is pointed out by the court that none of the special legislative acts defining the privileges conferred upon the corporations contains any words affirmatively providing that any part of the privileges granted should be deemed separable, or that they might be exercised independently of any other.

It was also ruled by the Supreme Court that the contention advanced by the company in regard to compelling a public service corporation to continue service at confiscatory rates, does not apply. The order compelling the company to serve does not involve a determination of whether or not the rate is confiscatory, it is pointed out. The written opinion of the Supreme Court states further that the order directing continuance of service does not foreclose appropriate proceedings for the determination of a proper return.

Announcements carried in editions of the afternoon papers at Columbia on May 19 that the United States Supreme Court had upheld the State Railroad Commission in its order to resume service were read eagerly by the people. At once the question was raised "When will the service begin?"

Ever since March, 1927, when the company stopped service, the question of transportation has been an outstanding one. At that time the State Railroad Commission ordered that service be resumed and required the company to show cause why service had been stopped without notice.

(*Continued on Page* 345)

COMING MEETINGS

May 27-29—National Conference on Street and Highway Safety, Washington, D. C.

June 16—National Association of Purchasing Agents, annual convention, Chicago, Ill.

June 23-26—American Electric Railway Association, 49th annual convention, San Francisco, Cal.

June 29-July 6 — International Tramway & Bus Association, biennial convention, Warsaw, Poland.

July 23-25 — Electric Railway Association of Equipment Men, Southern Properties, Nashville, Tenn.

July 24-25 — Central Electric Railway Accountants' Association, Cedar Point, Ohio.

Aug. 13-14—Wisconsin Utilities Association, Milwaukee, Wis.

Chicago Unification Ordinance Now Ready for Voters

On May 19 the Chicago City Council by a vote of 47 to 3 granted an indeterminate franchise to the Chicago Local Transportation Company, a merger of the financial interests in the present transit companies. This grant is subject to popular approval at the referendum to be held July 1, since Mayor Thompson has approved the plan.

According to the ordinance, the newly created company must consolidate the surface and elevated lines, operate city owned subways through the central business district, and feeder buses in the outlying districts. The ordinance calling for a public referendum July 1 was passed unanimously.

Members of the local transportation committee adopted a resolution authorizing Chairman McDonough to provide for a citizens' committee to prepare a plan of campaign for the ordinance. Ald. Arthur Albert notified the committee that no city funds shall be spent for ordinance propaganda.

One of the greatest obstacles to complete settlement of the railway problem was removed when representatives of various protective committees announced formally in letters to the City Council that the financial setup of the consolidated company has their approval and co-operation. All but one of these groups of participation certificate holders filed agreements. The latter is expected to co-operate, but believed it unwise to sign an agreement because of litigation started by it in the federal court.

Aldermen now urge speed on the subway ordinance which, according to some, should have been considered concurrently with the indeterminate franchise. As the subways are to be built by special assessments, it will require a resolution of the board of local improvements, later passage of an ordinance by the City Council, then a confirmation in court of the assessment spread.

Digitized by Google

LATE NEWS

(*Continued from page 342*)

Sacramento, Cal.—Opposition to a proposal for state taxation of municipally owned public utilities is expressed in a brief filed with the joint legislative tax committee by N. Randall Ellis, the valuation and rate engineer for the city of San Francisco. Since the state law requires in most instances a two-thirds vote of the people to authorize bonds for the establishment, extension or improvement of publicly owned utilities, the brief says that it has at times been comparatively easy for groups with ulterior motives to muster an adverse one-third vote, with the express intention and result of embarrassing the publicly owned utility in its program of expansion.

✦

Niagara Falls, N. Y.—The City Council has granted a 25-year consent to the International Railway to operate a bus line in Hyde Park Boulevard and three other streets, the franchise to become effective as soon as the increased fares on local railway lines are approved by the Public Service Commission. A 10-cent fare will be charged on the proposed bus line with free transfers to city trolley lines.

✦

New York, N. Y.—The Board of Estimate is to consider plans for extending Riverside Drive and the elevated express highway northward across Harlem Ship Canal and into the Bronx, and eventually into Westchester County. Development costs are estimated at $100,000,000.

✦

Washington, D. C. — Promiscuous building of super-highways is shown to be ill-advised in a summary of traffic statistics dealing with highway planning issued by the American Road Builders' Association. Instead, the association finds need of greater activity over the entire net-work of the nation's roads, with all construction preceded by a careful survey of the present traffic facilities and its future requirements. Regional planning is urged for all centers of traffic density. Such planning would indicate whether present roadways should be reconstructed to great width, or whether the construction of more arterial highways over new routes would be more advisable.

✦

Richmond, Va.—Seven railroads have sought to intervene in the Interstate Commerce Commission's injunction proceeding against the Piedmont & Northern Railway to restrain it from extending its lines in North and South Carolina. The company is seeking to build a 55-mile extension from Spartanburg, S. C., to Gastonia, N. C., and a 76-mile extension from Charlotte to Winston-Salem, N. C.

✦

Boston, Mass.—For the nine months of the trustees' fiscal year ended March 31, 1930, Boston Elevated Railway was approximately $400,000 ahead of results for the corresponding period a year ago. The cost of service, which includes dividends, was $37,336 in excess of revenue for the nine months to March 31 this year whereas the excess cost of service in the similar nine months a year ago was $437,346. March produced excess revenue over cost of service of $178,957 compared with $245,409 in March, 1929. In every other one of the nine months, says the Boston News Bureau, the results this fiscal year were more favorable than in the corresponding month of the year before. In March, the road carried 31,196,207 passengers compared with 32,745,247 in March, 1929.

✦

Columbus, Ohio — Summer schedules for five street car routes of the Columbus Railway, Power & Light Company, call for reductions in the round-trip running time.

✦

Coronado, Cal.—Application for a 25-year franchise to operate buses here in place of street cars has been filed with the City Council by the San Diego Electric Railway. Attached to the application was a detailed plan of operation on a through schedule between Hotel del Coronado and Third and Broadway, San Diego.

✦

Philadelphia, Pa. — Joseph S. McCulloch, city representative on the board of the Philadelphia Rapid Transit Company, is charged with misappropriating $280,000 of the funds of the old Union Bank & Trust Company, when he was its president last year.

✦

Los Angeles, Cal.—The Pacific Electric Railway has been authorized by the California Railroad Commission to acquire from Pacific Transportation Securities, Inc., 871,284 shares of the capital stock of the Motor Transit Company, operating an extensive stage service in southern California.

✦

New York, N. Y.—More than 60,000 questionnaire postcards, addressed to Frank Hedley, president of the Interborough Rapid Transit, are being distributed to passengers on the Sixth Avenue elevated in an effort on the part of the Interborough to determine public sentiment on the proposal to condemn and remove this elevated line before work is started on the Sixth Avenue subway. The Interborough contends that immediate removal of the elevated structure on Sixth Avenue would dangerously overload both its Seventh Avenue and East Side subway lines.

✦

Philadelphia, Pa.—The Pennsylvania Railroad has made available for the information of the public the lecture "Co-ordinated Transport," delivered before the economics class of Rutgers University on Feb. 21, 1930, by George Ogden, assistant vice-president of the Pennsylvania. It contains a complete exposition of the position of President Atterbury that the railroads must be ready to give the kind of service the American people want and that the railroads must consider themselves not railroads merely, but general transportation enterprises. The lecturer set forth the extent to which the Pennsylvania has put the plan into practice.

✦

Nashville, Tenn. — Each of the 400 trainmen of the Nashville Railway & Light Company wore a pink or a white carnation Mothers' Day. Tom Joy, Church Street florist, presented a huge box of flowers to J. P. W. Brown, vice-president of the company, who in turn distributed them among the men.

✦

Baltimore, Md.—A demand that the Maryland Public Service Commission act to abolish a 3-cent transfer charge between street car and bus, both operated by the United Railways & Electric Company, has been made upon the commission by the Park Heights Civic Improvement Association. The transfer charge is made between the buses on the Reistertown road and the street cars which continue to the center of the city. It is contended that those who use this system are required to pay a 13-cent fare. The association objected about a month ago and now demands that the commission take definite action.

✦

Butte, Mont.—Bonuses totaling nearly $1,200 will be distributed among trainmen of the Butte Electric Railway. The award is for excellent service and a record free of accidents for the period between Nov. 1 and May 1. The record during the last six months is the best that has been made in more than a decade.

✦

Detroit, Mich.—The experience of being removed on Wednesday, re-hired on Saturday, and the probability of being fired again has befallen Frank Couzens, son of the Senator. On May 14, Mr. Couzens resigned from the street railway commission at the request of Mayor Bowles, who charged that he had failed to co-operate with him and the other members of the commission. The Mayor and his family left May 16 for the Derby at Louisville, and the four ranking members of the City Council also left town. Councilman John S. Hall, a dentist, succeeded to the position of Acting Mayor over the week-end. His first act was to deliver to Mr. Couzens a letter informing him that he had been reappointed to the commission.

St. Louis, Mo.—Barney W. Frauenthal, general traffic agent for the St. Louis Public Service Company, has been re-elected secretary-treasurer of the St. Louis Railway Club.

DELEGATES AND GUESTS TO

A.E.R.A. Convention

SPECIAL train reservations are coming in to Association Headquarters daily. The "Family Party" idea has taken hold. With few exceptions every delegate is being accompanied by at least one member of the family.

Special train lists go to press June 2. If you intend using one of the special trains to the convention, send in your confirmation blank covering reservations secured for yourself and party on or before June 2, if you wish names shown in lists.

A.E.R.A. TRANSPORTATION COMMITTEE.

"Remember your date at the Golden Gate"

Digitized by Google

Man Power Governs Quality and Cost of Bus Maintenance

With a varied and interesting program of papers and discussions covering maintenance matters, the regular semi-annual meeting of the Electric Railway Association of Equipment Men, Middle Atlantic States, was held at the Hotel Casey, Scranton, Pa., May 14 and 15. President W. H. McCarty conducted the meeting, which was attended by 65 railway delegates and "commercial ambassadors."

The problem of carbon brushes, their functions, inspection and care, was covered in a paper by W. Seibenmorgen, consulting engineer. The general discussion brought out much of interest in connection with this controversial subject.

The planning and lay-out of garage facilities and the organization and training of a bus maintenance and operating personnel were covered in a paper by A. E. Degen, technical service manager, General Motors Truck Company. According to Mr. Degan, poorly arranged storage space and make-shift methods have run up the maintenance expense charged against bus operation by railway operators, but more approved practices are coming into use as the real value of the bus as an ally to railway operation has become more generally appreciated.

The speaker also emphasized the importance of a well trained personnel in shop maintenance. "Man power," he said, "governs, to a great extent, not only the quality of maintenance, but also the cost. A good maintenance superintendent with the right kind of an organization can secure better results with a poor building and equipment than an inefficient one with the most modern and elaborate of maintenance stations." Discussion on this subject was led by J. R. McGorum, assistant master mechanic, Virginia Electric & Power Company, Norfolk, Va., and D. E. Frame, superintendent of equipment, Delaware Electric Power Company.

Question box discussion covered a wide range of subjects, including tire mileage, arc welding of wheel flanges, lamp life, and radio interference. In the matter of lamp life, E. L. Broe, of the General Electric Company, told of the experiments now being conducted at Nela Park laboratory with the view of developing a stronger filament for frosted globes. It was the opinion that the size of tires for buses should be determined by the tire manufacturer rather than the bus manufacturer, particularly where contracts with tire companies are written on a mileage basis.

That the electric railways are being blamed for much radio trouble for which other agencies are responsible was the concensus of opinion of the operators present. Radio frequency coils installed in the trolley circuits and non-arcing trolley wheels were suggested as remedies for much of the trouble reported, although careful tests will more often indicate that leaky transformers or industrial motors cause interference.

Delegates and visitors were guests of H. H. Dartt, president of the Scranton Railway, at a banquet on the evening of May 14. The following day they toured the company's shops.

Officers elected for the ensuing year were: President, D. E. Frame, superintendent of equipment, Delaware Electric Power Company, Wilmington, Del.; vice-president, J. T. Porter, superintendent of equipment, Virginia Electric & Power Company, Richmond, Va.; secretary-treasurer, R. D. Voshell, superintendent of equipment, Washington Railway & Electric Company, Washington, D. C. The next meeting of the association will be held at Norfolk, Va., at a date to be announced later.

An Unusual Traffic Survey in Washington

A traffic survey that promises to supply information of a type heretofore not obtained is being conducted in Washington by Miller McClintock, traffic engineer, under the auspices of the National Park and Planning Commission. While other traffic studies have fairly well established the modes of transportation used by shoppers, this survey will show the proportionate buying power of the various groups. It has been shown before that from 70 to 90 per cent of downtown shoppers (depending on the size of the town) travel to and from the stores in street cars and by other forms of mass transportation.

Since sales per customer are regarded by merchants as being just as important a factor as the total number of customers, the facts revealed in this connection may have an important bearing in determining the attitude of the storekeepers on parking.

Another feature of the survey will be an effort to record time consumed in parking. Tabulation will be made of the time elapsed until the feat of parking finally is accomplished.

Aerial photography has been brought into play so that the engineers may study the amount of downtown space used for parking. Studies also are being made of the off-street parking facilities. As another part of the survey, all of the government employees are being asked to indicate the form of transportation they employ in going to work. They will be asked where they park their cars, if they travel by this means, and whether or not they would be willing to pay a small fee for off-street parking.

Increase in Ticket Fare Asked in Omaha

The Omaha & Council Bluffs Street Railway Company on May 12 applied to the Nebraska State Railway Commission for an emergency order increasing fares in Omaha from three tokens for 20 cents to three for a quarter. The cash fare of 10 cents would remain unchanged, but the token fare would be increased from 6⅔ cents to 8⅓ cents. The commission has set May 21 as the date of a hearing.

According to President Shannahan, three things are responsible for the present emergency: a radical decline in business since the first of the year which has caused the revenue to be $1,100 a day less than 1929; the addition of 42 more miles of bus service which has increased expenses $175,000 a year, and an increase in wages which has added $65,000 a year.

The last valuation of the company's property made in 1919 was $14,100,000 and on a basis of 7 per cent return on this the company is entitled to $1,004,507 more than it is now earning, and even though the increase in fare be granted, Mr. Shannahan estimated that the company would still be short $396,819 of earning the fair return on its investment.

Until the Douglas Street Bridge was presented to the cities of Omaha and Council Bluffs under an arrangement whereby the cities will own the bridge in six and one-half years or less by using the tolls received to pay the stockholders of the bridge company $60,000 annually, to retire $60,000 of bridge company bonds, and to deposit at least $300,000 with the trustee of the railway bonds, the revenue received from the bridge tolls was used to make up the constantly increasing deficit in the company's revenue.

In his statement to the City Council, Mr. Shannahan pointed out that Omaha's present fare is below the general average and that the token fare of three for 25 cents is being charged in many of the large cities with even a higher fare being charged in other cities. The company said:

In spite of constantly decreasing business and constant demands for extensions and additions to the service, Omaha's street car system has been maintained in 100 per cent condition so that our citizens can and do truthfully say that Omaha's street car system is as good as or better than any other in the country. Since 1920 we have spent for maintenance $2,904,268, and in that same period we have made actual additions to the property costing $1,159,370. In 1929 alone we spent nearly $500,000 for new buses and new power equipment, all for the benefit of the service.

New Control of Pedestrian Traffic in Effect in New York

Police Commissioner Whalen's proposals for the control of pedestrian traffic in New York City went into effect on May 19, in the form of additions to present traffic regulations. The first provision is that pedestrians shall cross the street only at a roadway or marked crosswalk; this is aimed at the jaywalker. The second provision is that at intersections where traffic is controlled by signals or officers, pedestrians shall cross the street only when vehicular traffic over the crossing in question is stopped, and that pedestrians so crossing the street shall have the right of way over all vehicles, including those making a turn. The third provision is that at intersections where traffic is not controlled by signals or officers pedestrians shall have the right of way over all vehicular traffic.

Receiver Would Sell Indiana Union Traction

Arthur W. Brady, receiver for the Union Traction Company, Anderson, Ind., has filed in Madison Circuit Court a petition asking for an order to settle accounts, determine liens and sell the property in receivership.

The receiver said that the transportation revenues declined about $125,000 from Jan. 1, 1930, to March 15, compared with the similar period last year. The receiver said that freight and express business were the only means of making good the losses and that $2,000,000 would be needed to improve this service.

Digitized by Google

Temporary Franchise Agreement in Akron Extended 19 Months

An agreement has been reached between the Northern Ohio Power & Light Company and the city of Akron to extend the city franchise for a period of 19 months from Sept. 1, 1930. The agreement was reached after a two-hour session between A. C. Blinn, vice-president and general manager, and the Council sitting as a committee as a whole.

In a statement to Council, Mr. Blinn pointed out that due to the prevailing industrial depression the franchise had not had a fair opportunity to show what could be done under it, and suggested that an extension be granted, based upon the prevailing rates of fare and under present provisions.

The present schedule provides for an 8-cent fare where exact change is provided, otherwise 10 cents; seven tokens are sold for 50 cents, and a book of sixteen tickets for $1. Express bus service at a fare of 10 cents is provided.

Akron newspapers were warm in their praise of the position taken by the company. "The public will approve the agreement between Council and the N. O. P. & L. Co.," declared the *Times-Press*. "As an experiment the current franchise has had but small opportunity."

The *Beacon Journal* said that "Manager Blinn and his company will make friends in Akron by their own fairness in the negotiations which led to the result." Continuing its editorial, the *Beacon Journal* declared that "the company had shown good sportmanship in making up its mind to go along without asking an increase in fare under present conditions."

The franchise under which the company is now operating became effective on May 26, 1929, and expires on Sept. 1, 1930. The idea was that a short-term contract at rates higher than those formerly in effect would furnish reliable data for a reasonably long term franchise.

Vaughan Tie Tamper Patent Upheld

Judge Hugh Morris of the United States District Court of Delaware in an opinion handed down on April 23, decided the suit of Fanny Minton Vaughan and the Ingersoll-Rand Company against the Gardner-Denver Company for infringement of the Vaughan tie tamper patent No. 1147660 in favor of the plaintiffs. The Ingersoll-Rand Company is the principal licensee under the patent.

Reorganization of Utah Line May Be Speeded

Reorganization of the Salt Lake & Utah Railroad and release from its present receivership may be possible at an earlier date than was expected, through action of the United States Supreme Court in denying the suit of the United States for precedence in claims against railroads which borrowed federal funds during and after the world war. D. P. Abercrombie, receiver for the railroad said that "assuming the government recognizes the Supreme Court decision as a precedent in the Salt Lake & Utah case, the situation should permit a reorganization at an early date."

The Supreme Court decision was made in the case of the United States vs. the Guarantee Trust Company, New York, acting as trustee of the bond issue of the Minneapolis & St. Louis Railroad. The government sought to enforce prior payment of a loan, similar to the $830,000 borrowed by the Salt Lake & Utah from a revolving fund established during the war for the benefit of the small railroads. The court held that the government, in making loans under this section, was engaged in business, and therefore entitled to no priority.

Supreme Court Upholds Lower Court's Decatur Decree

In the case of the Georgia Power Company, Atlanta, Ga., versus the city of Decatur a judgment of the Supreme Court of Georgia affirming a decree enjoining a street railway from violating an ordinance and a contract requiring it to carry passengers for a certain fare (in this case 5 cents) was affirmed by the United States Supreme Court on May 19. The railway contended that the rate was confiscatory and that the franchise and the rate contract had expired.

The State Supreme Court had held that the contract specifying the rate was still in effect, and the United States Supreme Court accepted the state court's construction of the statutes of the state and the ordinance and rate contract, and held that, inasmuch as the contract was still in effect, the street railway was not entitled to relief therefrom, although the company was losing money.

Competition Brings Protest at Duluth

An injunction is sought by the Duluth Street Railway, Duluth, Minn., to restrain the Gopher-Badger Bus Company from operating between 6 a.m. and 10 p.m. on Duluth streets having double street car tracks, except on condition that the buses do not stop to pick up or discharge passengers on West Third Street between Vernon and 38th Avenue West. The railway charges that the bus company has carried local passengers between the two points. It cites an ordinance passed by the City Council on June 16, 1924, giving the railway rights and privileges on all such streets.

The bus company points out that there have always been double tracks on the main thoroughfares leading from Superior to Duluth and that the Superior White Company, prior to its purchase in April, 1925, by the railway, operated despite the ordinance with no objection on the part of the electric railway. The answer also charges that the railway, which owns and operates the Duluth-Superior Coach Company, has had a monopoly on Twin-Ports transportation for many years and that the present action is intended to maintain and continue such monopoly.

Madison Company Demurs to Paving

The Madison Railways, Madison, Wis., has declared that it will incur no further liability for paving of track zones until it has paid its present obligation to the city. This is the reply to the city by the company in answer to the city's request that it prepare for permanent improvement of its right-of-way on Winnebago Street from the Yahara River to Second Street.

In a letter to city officials, the company says that it is not able to make the improvement at this time and suggests that the work be deferred until later. The city awarded the paving contract on Winnebago Street a year ago, but work was delayed until this year because the railway was not prepared to carry out its share of the improvement at that time. At the next Council meeting, city officials will decide whether to postpone work for another year, or proceed and charge the cost against the utility.

The Madison Railways has applied to the Railroad Commission for an increase in fares. Hearings on the application will begin June 9.

Columbia Case Decided

(*Continued from page* 312)

The company filed a petition for authority to discontinue service and for a hearing on the matter and the Railroad Commission, by a vote of four to three, allowed the company to discontinue service—or rather to let the service stay stopped.

Meanwhile the state attorney general asked for a rehearing. One member of the commission had died and another had been appointed in his place, and when it came to a vote on the motion to reverse its former ruling, the commission decided four to three so to do and the company was ordered to resume service. The attorney general petitioned to the State Supreme Court for a mandamus to compel the company to restore service. Various other steps were taken and finally the matter went to the United States Supreme Court.

Transportation has been an important issue in municipal politics. In the recent election of a Mayor and City Councilmen it came in for much discussion, even though at the time the issue was in the United States Supreme Court.

A bus company has been supplying more or less indifferent service since the street cars ceased to run, but due to the fact that the matter was in the courts, the company hesitated in making any heavy investment in equipment. Jitneys flourished for a time, but finally the City Council ruled them off the streets so that the bus company might get all the patronage.

Now citizens hope to see trolleys again on the streets. The tracks and the overhead are in place, but in need of repair. The carhouse is intact.

Taxi Cuts Seattle Revenue

Demand for action in the taxicab situation in Seattle, Wash., has been made on the City Council by Moritz Thomsen, who urged that Sam W. Taggart be permitted to control all taxicabs in the city for 25 years, in return for guaranteeing the city at least $500,000. With taxicab competition increasing, the $20,000 monthly loss now sustained by the municipal railway will be increased unless the city takes steps to control the taxicabs, Mr. Thomsen declared. Councilmen contend, however, that loss of revenue by the municipal railway results chiefly from reduction in service on the bus and car lines, and from increased use of private automobiles, rather than from competition by taxicabs. One councilman declares that "by reducing service, the railway is playing into the hands of the taxicab companies." Long waits for street cars and slow service are said to explain the falling off in railway revenue.

Digitized by Google

Move to Restrict Freight Service of Interurban

Whether the transition of a transportation activity induced by changing conditions produces rights which supercede the regulations imposed in a municipal franchise is a question which is expected to go before the Ohio courts. The question arises from a dispute between the Cincinnati & Lake Erie Railroad and Springfield property owners over the operation of freight trains on company lines. On April 14 developments pointed to an early attempt on the part of the property owners to obtain an injunction against the company, with the latter prepared to contest the suit to the limit.

Some weeks ago the property owners on streets traversed by the company's lines asked the City Commission to enforce the terms of the franchise ordinance, which limits freight operation. When the franchise was granted a score of years ago, the passenger business furnished the bulk of the income and with little freight business except light express and milk. Today, through freight service in regular freight cars has become a common practice.

Springfield is the hub of the Cincinnati & Lake Erie lines. Hence the reason for the company's extra interest in the local situation. Following receipt of the petition from property owners, the commission instructed the railroad to obey the terms of the ordinance. However, twenty large industrial concerns have protested enforcement of the ordinance, and beyond the gesture, the commission is expected to take no further steps in the matter. But property owners declare they are prepared to go into the courts to seek an injunction. Meantime, the freight service continues.

Rate War Among Springfield Taxis

Taxicab companies in Springfield, Mass., have started a rate war. The Aldermen established a minimum rate for metered cabs of 35 cents for the first third of a mile and 10 cents for each additional third of a mile. One company ignored the order and operated its cabs at 20 cents for the first quarter mile and 5 cents for each additional quarter to test the legality of the municipal ruling. The city solicitor advised against taking away the license of the offending company, being doubtful as to the city's powers. Other companies then began carrying passengers anywhere in the city for 50 cents. As the latest step the Aldermen have adopted a new minimum rate for metered cabs of 25 cents for the first quarter mile and 5 cents for each additional quarter mile. The zone rates for unmetered cabs have been reduced to a 50-cent fare for one or two passengers and 25 cents for each additional passenger in the first zone, with 25-cent advances in the second and third zones, respectively.

City After Local Detroit Buses

Detroit's City Council has refused to approve the contract made by the Street Railway Commission for the purchase of fifty 40-passenger buses. Action has been postponed for at least 30 days. The Council voted to defer the purchase pending the outcome of negotiations between the Department of Street Railways and the Detroit Motor Bus Company for taking over the company's lines for articulation with the city system.

Council members desire to know where buses would be used, and the commission was asked by the Council for a progress report on its negotiations with the bus company. When the bus purchase was first authorized by the commission, Frank Couzens, then a commissioner, asked if the purchase was necessary in view of the probable taking of equipment from the private company. President Barlum, of the commission, said the new equipment would be needed whether or not the bus company equipment was taken over by the city.

Northern Ohio Withdraws from Operating Canton City Lines

After months of negotiations an agreement has finally been reached in the Canton, Ohio, transportation situation. Two companies, one the Canton Traction Company and the other the Canton Motor Coach Company, are to supply the city with transportation. The Canton Traction Company takes over part of the lines formerly operated by the Northern Ohio Power & Light Company. The agreement provides for an exchange of free transfer between the two companies. The fare is to be 7 cents cash, eight tickets for 50 cents, with a 5-cent school ticket.

The Oxford Avenue, the Mahoning Road, and the Bryan Avenue lines operated by Northern Ohio Power & Light Company are abandoned under the arrangement. Two tracks are to be taken off the Public Square and the loop known as the Cleveland Avenue-Fifth Street-Tuscarawas loop used by Stark Electric Company's interurban cars is abandoned. The Stark Electric cars will turn from Cleveland into Tuscarawas and then back to the Square.

In lieu of the Northern Ohio Power & Light Company being required to remove its abandoned tracks, the city is to receive a lump sum of $100,000. Bus service by the Canton Motor Coach Company is to supplant the abandoned lines and the Coach Company is to cease operating buses parallel to the East Tuscarawas line, which is to be operated by the Canton Traction Company. Other lines to be operated by the Traction Company are the Navarre-Garfield Avenue, Lake line, and the West Tuscarawas line. Suburban service from the Public Square of Canton to the Public Square of Massillon is to continue. Whether this suburban line will be taken over by the Canton Traction Company is a matter yet to be determined.

The Canton Traction Company is made up largely by Canton men and is not a subsidiary of the Northern Ohio Power & Light Company, being en- Ohio Power therefore withdraws from the Canton city transportation field.

Conspectus of Indexes for May, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares* 1913 = 4.84	May, 1930 **7.96**	April, 1930 **7.91**	May, 1929 **7.76**	May, 1930 **7.96**	May, 1925 **7.27**
Electric Railway Materials* 1913 = 100	May, 1930 **139.9**	April, 1930 **140.2**	May, 1929 **145.5**	Dec., 1926 **159.2**	Feb., 1928 **139.5**
Electric Railway Wages* 1913 = 100	May, 1930 **231.7**	April, 1930 **231.7**	May, 1929 **230.1**	April, 1930 **231.7**	May, 1925 **222.2**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	May, 1930 **201.1**	April, 1930 **203.0**	May, 1929 **199.5**	Nov., 1928 **205.7**	July, 1929 **199.0**
General Construction Cost Eng'g News-Record 1913 = 100	April, 1930 **205.9**	April, 1930 **207.1**	May, 1929 **205.2**	Jan., 1927 **211.5**	Nov., 1927 **202.0**
Wholesale Commodities U. S. Bur. Labor Stat. 1926 = 100	April, 1930 **90.7**	Mar., 1930 **90.8**	April, 1929 **96.8**	Nov., 1925 **104.5**	April, 1930 **90.7**
Wholesale Commodities Bradstreet 1913 = 9.21	May, 1930 **10.94**	April, 1930 **11.18**	May, 1929 **12.68**	Dec., 1925 **14.41**	May, 1930 **10.94**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	April, 1930 **151.2**	Mar., 1930 **150.1**	April, 1929 **151.6**	Nov., 1925 **167.1**	Mar., 1930 **150.1**
Cost of Living Nat. Ind. Conf. Board 1914 = 100	April, 1930 **157.5**	Mar., 1930 **157.4**	April, 1929 **159.3**	Nov., 1925 **171.8**	Mar., 1930 **157.4**
Industrial Activity Elec. World, kw.-hr. used 1913-25 = 100	April, 1930 **120.2**	Mar., 1930 **120.3**	April, 1929 **136.4**	Feb., 1929 **140.4**	Aug., 1925 **94.3**
Bank Clearings Outside N. Y. City 1926 = 100	April, 1930 **93.4**	Mar., 1930 **94.3**	April, 1929 **104.0**	Oct., 1929 **111.8**	April, 1930 **93.4**
Business Failures Number	April, 1930 1976	Mar., 1930 2093	April, 1929 1735	July, 1929 1581	Sept., 1928 1348
Liabilities, Millions of Dollars	**80.71**	**73.82**	**38.11**	**102.09**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Digitized by Google

PERSONAL MENTION

New Cleveland Men in Office

Brief Accounts of the Careers of the Representatives of the Van Sweringens Recently Elected to Executive Posts With the Cleveland Railway

ON APRIL 24 Paul Wilson, vice-president and treasurer of the Cleveland Railway, Ralph W. Emerson, vice-president and general manager, and Charles H. Stanley resigned as directors of the railway. In their places the following were elected: Charles L. Bradley, who was also made chairman of the board, Alva Bradley and Otto Miller. In addition, George D. McGwinn was made vice-president of the company. These changes were brought about by the desire of Messrs. O. P. and M. J. Van Sweringen, who control the Cleveland Railway through Metropolitan Utilities, Inc., to have active representation on the board and in the executive operating staff of the company.

Charles L. Bradley is rated as the closest business associate of O. P. and M. J. Van Sweringen. He has been closely identified with Van Sweringen enterprises since July 24, 1927, when he became president of the Cleveland Union Terminals Company.

Mr. Bradley and his brother, Alva R. Bradley, are members of an old and wealthy Cleveland family. Their grandfather was Capt. Alva Bradley, who sailed the Great Lakes and made a fortune in the shipping business. Their father, M. A. Bradley, put the money to work in downtown Cleveland real estate, large parcels of which are still owned by the Bradley estate.

Both Charles and Alva Bradley were graduated from Cornell University.

Charles Bradley attracted attention during the war as head of the Cleveland liberty loan organization—during the third, fourth and fifth campaigns. In 1919 he was made vice-president of the Union Commerce National Bank. When the Union Trust merger was completed he was made vice-president and later general manager of that company.

In 1927 the Van Sweringens asked him to take over the job of completing the Cleveland union terminal and he succeeded O. P. Van Sweringen as president of the Cleveland Union Terminals Company. On April 26, 1929, he was made chairman of the board of the Erie Railroad, which is controlled by the Van Sweringens. Also, in 1928, he headed a syndicate which acquired control of the Midland Bank. This bank will move shortly to a new building in the Van Sweringen terminal area. He is also a director of a number of other companies, including the Cleveland Hotel Corporation, Cleveland Traction Terminals Company, Otis Steel Company, White Motor Company, and Hupp Motor Car Corporation.

Alva Bradley is best known at this time in Cleveland as president of the Cleveland Baseball Club. Charles Bradley is also a director of the club. Alva Bradley was a director of the Cleveland Trust Company for ten years. He resigned in 1928 to become associated with his brother as a director of the Midland Bank. He is also a director of the Chesapeake & Ohio Railroad, chairman of the board of the Cleveland Builders Supply & Brick Company, and chairman of the Cleveland & Buffalo Transit Company. In 1929 he was president of the Cleveland National Air Race & Show Corporation under whose auspices the national air races were conducted.

At top, C. L. Bradley
At left, G. D. McGwinn
At right, Alva Bradley
At bottom, Col. Otto Miller

George D. McGwinn comes into electric railway operation through the channels of building management and construction. Mr. McGwinn was a specialist in building management. Among the structures of which he was in charge were the Citizens and the Union Commerce National Bank buildings. When the Union Trust merger was brought about, Mr. McGwinn was confronted with the problem of housing the forces of four banks in a building that was considered too small for one. He managed it for three years, while the Union Trust building was under construction, and then was made vice-president and building manager of the Union Trust Company.

When Charles Bradley left the Union Trust Company to become president of the Cleveland Union Terminals Company, he took Mr. McGwinn with him as vice-president of the terminals company.

The two became known as the team of Bradley and McGwinn. As expert "trouble shooters" they proceeded to mop up one difficulty after another that confronted them in the completion of the mammoth terminal project.

Upon becoming vice-president of the Cleveland Railway, Mr. McGwinn resigned as vice-president of the terminals company, which was considered a pretty good indication that most of the difficulties in the way of the completion of the terminal were solved.

Otto Miller is a partner in Hayden & Miller & Company, which he founded in 1903 with Warren S. Hayden. As an investment banker he has participated in the sale of numerous Van Sweringen security issues and has been a director in a number of companies they control, including the Chesapeake & Ohio and Hocking Valley railroads. Mr. Miller is a veteran of the Spanish-American War. He was a member of the governor's staff for many years and a captain in Troop A, exclusive social and military cavalry organization in Cleveland. In 1928 he was elected president of the Western Reserve Historical Society.

Harry A. Osgood Master Mechanic at Binghamton

Harry A. Osgood has recently been appointed master mechanic of the Triple Cities Traction Company, Binghamton, N. Y., to succeed Frank Hampshire, who has been with the company for 23 years, the last eight years as master mechanic.

Mr. Osgood comes from the Massachusetts Northeastern Street Railway, operating in Amesbury, Haverhill, Lawrence, Newburyport and Saulsbury, Mass., and Salem, N. H.

Mr. Osgood started his railway career with the Massachusetts company in 1907 and has been master mechanic for the past ten years. His home was at Salem, N. H., where he has been active in local affairs, serving as chairman of the board of trustees of the First Congregational Church, member of the board of water commission, director in a local bank and member of the New England Street Railway Club. He is a Shriner.

Col. A. T. Perkins Honored

Members of the 327th and 359th Engineers and the Society of American Military Engineers held a special meeting on the snagboat *John Macomb* the night of April 29 to honor Col. Albert T. Perkins, vice-president of the City Utilities Company, St. Louis, who recently was placed in the auxiliary reserve of the United States Army and automatically relieved of the post of commanding officer of the 327th Engineers of the 102nd Division. Col. H. Austill, who succeeded Col. Perkins as commander, made the principal address. On behalf of the engineers he presented Col. Perkins a loving cup as a remembrance. In making his response, Col. Perkins stressed the need for national defense and an organized reserve corps.

Digitized by Google

Messrs. Vandeveer, Barkey and Lathrop in Detroit Changes

Recent changes in the personnel of the Department of Street Railways at Detroit, Mich., include the removal of Arthur L. Barkey, claims attorney for the department, and the resignation of Rufus G. Lathrop, secretary to the commission.

Mr. Lathrop has served the commission since 1925. In accepting his resignation the commission voted unanimously to write a vote of confidence in Mr. Lathrop into the records of the commission. His successor has not been named.

Mr. Barkey will return to his old position as assistant corporation counsel and the former position of claims attorney will not be filled. A new position, to be known as general trial attorney for the Department of Street Railways, has been created and to it Fred L. Vandeveer has been appointed. Mr. Vandeveer has been head of the claims department of the Travelers' Insurance Company for 27 years and his new appointment was made upon motion of Commissioner Dohany, recently appointed a committee of one to investigate the D.S.R. claims division. The new position will be under control of the D.S.R., and separate from the Corporation Counsel's office.

Glenn C. Spink, who served in Mayor Bowles' campaign headquarters during the last election, has been named employment manager of the Department of Street Railways, at Detroit, Mich.

Mr. Spink succeeds Joseph A. Burman. Wesley C. Stephens was the first man to replace Mr. Burman. Mr. Stephens was on the job 72 hours when the mayor ordered Mr. Burman, one of the veterans of the organization, to be restored.

✦

A. Le Roy Hodges, formerly manager of the Brockton division of the Eastern Massachusetts Street Railway, has been appointed manager of the Boston, Worcester & New York Street Railway, operating an extensive system of railway and bus lines, with service by bus reaching from Massachusetts towns to New York. Mr. Hodges' railway experience dates back to 1908 with the Westchester, Kennett & Wilmington Railway at Kennett Square, Pa., and covers service on other properties in the East and in the Middle West, notably in the post of assistant general manager of the Brooklyn City Railroad.

✦

R. A. Gallagher has been appointed comptroller of the Central Public Service Corporation, Chicago, Ill. He will have jurisdiction over the accounting of all properties in the Central Public Service Corporation group, which operates in 471 communities of the United States and in two provinces of Canada.

✦

John R. Marsh Advanced at Atlanta

"P. S. Arkwright, president, announces the appointment of John R. Marsh, formerly assistant manager, as manager, public relations department, Georgia Power Company, succeeding L. K. Starr, resigned."

John R. Marsh

That was all there was to the formal card issued recently to those who might be interested, about the advancement to one of the most important posts of its kind in the utility field of one of the ablest and youngest of the men engaged in this particular form of activity.

John R. Marsh has worlds of experience that qualifies him technically for the new post, but more than that he has innate and cultivated attributes of inestimable value to the incumbent of a position such as his. These have been unmistakably reflected in his work on *Two Bells,* distributed to patrons of the railway, and on the company's publication intended for distribution among the employees. Not only does he write well, but there is that divine touch about what he does which reflects the milk of human kindness that enables him to clothe a fact in garments of fancy. That, of course, is art. And John R. Marsh is an artist.

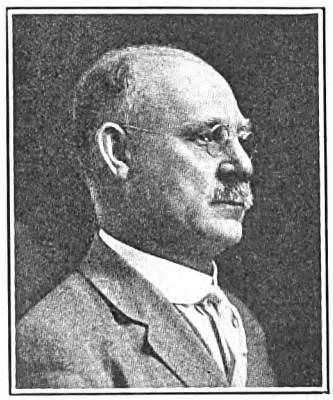
Biographically speaking, Mr. Marsh was born in Maysville, Ky., on Oct. 6, 1895. He was graduated from University of Kentucky, at Lexington, with the degree of A.B. in 1916. He worked as reporter on newspapers in Lexington, Ky., following his graduation, and served over seas during the World War. He moved to Atlanta in 1920 and worked as reporter on the *Atlanta Georgian.* That post he resigned in April, 1922, to take a position with the public relations department of the Georgia Power Company, but left the company after a few months to re-enter newspaper work, serving with the *Atlanta Journal* and with the Associated Press in Atlanta and Washington. He returned to the Georgia Power Company in September, 1924, and shortly thereafter was appointed assistant manager, public relations department, serving in this capacity until appointed manager of the public relations department on May 9, 1930.

Charles O. Birney, Car Designer, Retires After Thirty Years

Charles O. Birney has resigned from the Stone & Webster organization. After thirty years of constructive labor in the electric railway business, Mr. Birney has decided to allow himself more leisure for those pursuits which his very active life has hitherto denied to him.

It was in 1906, the year Mr. Birney was made a member of the Stone & Webster division as a car inspector, that he found real scope for his constructive powers. In 1909 he designed the continuous "T" post and continuous sash type of car, a radical departure from the standard type, so much so, indeed, that it was difficult to persuade the car builders to undertake the first order, which was for the Jacksonville Traction Company. This type has now become widely used.

When jitneys became serious competitors of electric railways in 1915, it was Mr. Birney who relieved the situation by designing the one-man safety car, which is now universally associated with his name. Like all drastic innovations, this one was received doubtfully at first, but the responsible operating executives of Stone & Webster were confident of the possibilities of the new car, and their confidence was justified. It is estimated that this method of construction and operation today is saving the electric railway industry more than $30,000,000 a year. From that time until the present, Mr. Birney has worked to improve methods of car construction and operation.



Charles O. Birney

Charles O. Birney was born about 63 years ago. He began his business career at the age of nine. For the next fifteen years Mr. Birney was engaged in steam road car building. In December of 1899 he accepted a job as a car builder with the Seattle Electric Company in its Seattle plant. At this time, he says, he had a wife, two children, and just $2 capital. He had to borrow his tools, for his own equipment consisted of a pocket knife, a 10-cent rule, and a pencil. His wages were $2.50 a day, and he worked ten hours.

Within ten days Mr. Birney had received two raises, in six months he took over all the pattern work, and in another six months he had become foreman of all the woodworking departments. By the end of another year he was general foreman of the entire mechanical department. In March, 1906, he was sent to St. Louis to superintend the building of 25 cars for the Seattle Electric Company, and while there he took charge of other cars being constructed for various companies under Stone & Webster management. The same year Mr. Birney was made a member of the Stone & Webster engineering division as car inspector. As stated previously it was in this position he found scope for his constructive powers.

Digitized by Google

Indianapolis Company Under G. C. Forrey, Jr., Receiver

George C. Forrey, Jr., recently appointed receiver of the Indianapolis Street Railway, is president of the Fletcher American Company, Indianapolis, and first vice-president of the Fletcher American National Bank.

His long career as an Indiana investment banker has brought him into close touch with the electric railway lines of the state and their financial problems. For a number of years, he has been a director of the Terre Haute, Indianapolis & Eastern Traction Company, and two of its leased properties, the Terre Haute Traction & Light Company and the Indianapolis & Northwestern Traction Company.

Mr. Forrey was born in Anderson, Ind. He attended Culver Military Academy and Williams College at Williamstown, Mass., (A.B. 1903). After leaving college, he became connected with the Anderson branch of the investment securities firm of Breed, Elliott

George C. Forrey, Jr.

& Harrison. Seven years later, he went to Indianapolis as vice-president of the same organization, a position which he held for eight years.

When the Fletcher American Company was organized in 1920, Mr. Forrey was appointed vice-president and general manager and in 1923 was elected president of the company as well as vice-president and director of the Fletcher American National Bank.

In addition to occupying these offices, he is president of the Belmont State Bank of Indianapolis, chairman of the executive committee of Indianapolis Abattoir, Inc., and a director of several other important local industrial institutions.

Mr. Forrey is a member of the Indiana Bankers' Association, Indianapolis Athletic Club, Columbia Club and various fraternal orders.

✦

T. P. Pfeiffer Advertising Manager

T. P. Pfeiffer has been appointed advertising manager of the Byllesby Engineering & Management Corporation and the Standard Gas & Electric Company, Chicago.

J. W. Hicks has been appointed publicity director of the Byllesby Engineering & Management Corporation and Standard Gas & Electric Company, also remaining in charge of the publications of these companies issued for executives and employees.

D. Ernest Frame

Delaware Executive Heads Middle Atlantic Equipment Men

D. Ernest Frame, elected president of the Electric Railway Association of Equipment Men, Middle Atlantic States, at the meeting in Scranton, May 14-15, is superintendent of equipment of the Delaware Electric Power Company, Wilmington, Del. Mr. Frame's experience has not been so wide in the sense of the number of properties on which he has served, as it has been thorough and intensive. He is a product of the apprenticeship system, having served his time in the Baldwin Locomotive Works as a machinist. In 1909 he was appointed a repairman with the Philadelphia Rapid Transit Company. Four years later he was appointed foreman of the company and in 1916 was appointed district superintendent of car maintenance of the company. This position of district superintendent he resigned in 1921. For the year 1922 he was superintendent of the West Chester Street Railway. In 1923 he was appointed foreman of the Delaware Electric Power Company and in 1924 was appointed superintendent of equipment of the company, successor to the Wilmington & Philadelphia Traction Company.

✦

L. C. Whitney with Copperweld

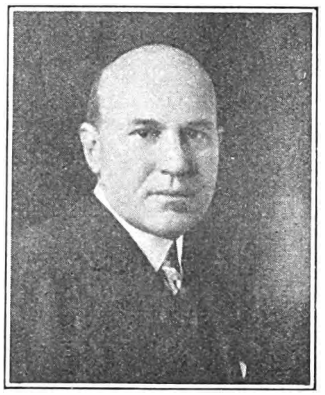
Leslie C. Whitney has joined the mill organization of the Copperweld Steel Company, Glassport, Pa., as chief metallurgist. Mr. Whitney was graduated from Lehigh University in 1922 as metallurgical engineer. For the past five years, he has been employed as assistant head of the physical laboratories for one of the largest wire manufacturers in the country. His work there covered all phases of round and flat wire production, open-hearth, rolling, drawing, and fabrication of wire products. Mr. Whitney is now supervising the installation of equipment in the Copperweld Steel Company's new research laboratory. This laboratory will combine the chemical, metallurgical, mechanical testing, and heat treating laboratories. The latest type of testing equipment is being installed throughout.

L. C. Whitney

✦

E. W. Stout Railway Receiver

Elmer W. Stout, appointed receiver of the Terre Haute, Indianapolis & Eastern Traction Company, is president of the Fletcher American National Bank, Indianapolis, the largest financial institution in Indiana and depository for several T.H.I. & E. security holders' committees. He also holds the position of vice-president of the affiliated Fletcher American Company.



Elmer W. Stout

Mr. Stout is a native of Indianapolis. He was graduated from Earlham College (Richmond, Ind.) in 1897 and from the Harvard Law School three years later. He practiced law in his home city from 1901 to 1916, during which time he acted as local attorney for the Indianapolis Water Company and several steam railroads and express companies. While attorney for the City Park Board, from 1908 to 1914, he drafted the park development program upon which the outstanding public park and boulevard system of the city of Indianapolis is founded.

His extensive legal and financial experience includes two years (1911 and 1912) as federal court receiver of the Ford, Johnson Company, Michigan City, Ind., former manufacturers of chairs and car seats.

In 1916, Mr. Stout was elected vice-president and general counsel of the Fletcher American National Bank and seven years later, in 1923, became its president. Simultaneously, he was named vice-president of the Fletcher American Company, an associated investment securities concern. In the seven years Mr. Stout has been chief executive of the bank, its deposits have more than doubled.

Mr. Stout is president of the Indiana Bankers Association and member of the Marion County and state bar associations, besides numerous Indianapolis clubs.

Digitized by Google

Departmental Activities Changed by Eastern Massachusetts

Because of the great increase in volume of work made necessary by the highly competitive nature of the transportation business, and also on account of the company's own entrance into the bus and motor coach field, it has been decided to readjust departmental activities in the Boston office of the Eastern Massachusetts Street Railway.

Effective May 15, Vice-President F. A. Cummings was assigned charge of public relations, advertising, relations between company and organized labor, and similar work as special representative of the company.

M. E. McCormick, manager of the Chelsea and Melrose-Woburn districts, has become general superintendent of transportation with headquarters in the Boston office in charge of the transportation department, reporting to A. J. Boardman, vice-president and general manager.

Albert E. Myers, superintendent of the Chelsea Division, has become manager of the Chelsea and Melrose-Woburn Divisions.

The record of Mr. Cummings with the company is well known. His work has been outstanding, best instanced, perhaps, in the extended biographies of him which were published in the issues of ELECTRIC RAILWAY JOURNAL for Oct. 25, 1924, and Sept. 15, 1923.

For the past six years Mr. McCormick has been manager of the Chelsea and the Melrose-Woburn Divisions and previously was manager of the Quincy, Salem and Lowell Divisions respectively. He worked his way up from the ranks at Bangor, Maine, where he was first employed by a street railway in 1896. He has held numerous executive positions in the mechanical and transportation departments and is thoroughly familiar with the street railway business.

After two years' service as manager of the New Brunswick Power Company at St. John, N. B., he went with the Eastern Massachusetts Street Railway in 1919, shortly after the public trustees took control of the road, and was assigned to manage the Quincy Division, from which he was promoted successively to the Salem, Lowell and Chelsea districts.

Albert E. Myers, who is succeeding Mr. McCormick as manager of the Chelsea and Melrose-Woburn Divisions, has been superintendent of the Chelsea Division for fifteen years. Prior to that time he was starter in Merrimack Square, Lowell.

William H. Giles, who was recently appointed superintendent of the Melrose-Woburn Division, will continue in the same capacity under supervision of Mr. Myers.

✦

H. R. Horton Superintendent of Instruction at St. Louis

H. R. Horton has entered the service of the St. Louis Public Service Company, St. Louis, Mo., as superintendent of instruction reporting direct to A. J. Fink, director of transportation. Mr. Horton was graduated from the University of Arkansas in 1916 with the degree of B.E.E. He immediately entered upon the graduate student course of the Westinghouse Electric & Manufacturing Company at Pittsburgh, Pa., and in 1917 became an engineer in the mechanical parts section of the railway engineering department, handling the designs of electric locomotives for mine and industrial work and for main steam road electrification. He was engaged on the pioneering work in the design and application of helical gearing, now in common use on street cars.

In 1927 he entered the employ of the Pittsburgh Railways as mechanical engineer in the instruction bureau, and on Jan. 1, 1930, became superintendent of instruction, reporting directly to Mr. Cooke, general superintendent of traffic and transportation. From that company he went to St. Louis. Mr. Horton was a member of the A.E.R.A. Committee on Employee Relations the past year, and also a member of the T. & T. Association committee The Employee, reflecting his keen interest in these subjects.

R. E. Plimpton, associate editor of *Bus Transportation,* a McGraw-Hill Publication, and a member of the editorial staff since the publication was established in 1922, has resigned, effective May 1, to assume a new position with the White Company, Cleveland, Ohio. For the past few years, Mr. Plimpton has represented *Bus Transportation* in the West with headquarters in Chicago. With the White Company, he will be in the sales promotion division as transportation engineer, conducting special investigations of bus operations.

✦

F. O. Whiteman has been appointed assistant general superintendent of the Chicago, South Shore & South Bend Railroad, South Bend, Ind., succeeding S. A. Morrison. Mr. Whiteman was formerly superintendent of service of the East St. Louis & Suburban Railway, East St. Louis, Ill.

Burton W. Marsh in Philadelphia Post Similar to His Pittsburgh Position

Burton W. Marsh

Burton W. Marsh, who was appointed as the first full-time municipal traffic engineer in the country more than five years ago by the city of Pittsburgh, became traffic engineer for Philadelphia on May 1. Through the improvements he has effected in the traffic situation at Pittsburgh and through his connection with many national committees, Mr. Marsh has become well known in the field of traffic safety engineering. The position of traffic engineer for Philadelphia was created in the 1930 budget, and comes under the administration of the department of public safety, of which Lemuel B. Schofield is director.

A downtown traffic survey, said to have been one of the most complete ever carried out as the basis for the consideration of installing a traffic signal system, was one of the steps taken by Mr. Marsh as traffic engineer of Pittsburgh. He was also influential in bringing about the establishment of the Pittsburgh Better Traffic Committee. This organization, appointed by the Mayor, is composed of business and professional leaders and city officials who are most closely concerned with street traffic problems. Mr. Marsh held the position of traffic engineer for this body, as well as for the city.

Upon the recommendation of Mr. Marsh, the Bureau of Traffic Planning was formed soon after he accepted the Pittsburgh position. This municipal department has continued to grow in personnel as well as in the appropriations made for it. For 1930, the City Council approved the expenditure of $253,400 for the bureau and its advisory body, the Better Traffic Committee. This sum is to be used for such undertakings as the erection of new traffic control equipment, signs, markings and the like, as well as to cover the salaries of the personnel. It also includes $17,500 for educational work.

Mr. Marsh was actively in charge of the design, installation and operation of the flexible progressive signal system covering 89 intersections in downtown Pittsburgh. This comprises the largest single progressive control signal system in the country. Pittsburgh's through highway system, made "fool proof" through the use of attention-compelling, flashing Neon "Stop—Through Traffic" signs, was started by Mr. Marsh last February. He was also responsible for carrying out yearly city-wide traffic counts and for starting continuous, intensive analyses of traffic accidents and development of suitable remedial measures.

Mr. Marsh is a graduate of Worcester Polytechnic Institute. Following his graduation, he attended Yale as a post-graduate student for one year. Prior to becoming traffic engineer in Pittsburgh, he was engaged for three years in municipal consulting engineering work covering traffic studies, city planning and zoning.

Mr. Marsh is vice-chairman of the engineering committee of the National Safety Council and is chairman of the program committee of the street and highway section of the National Safety Congress for 1930. He is a member of the model municipal traffic ordinance committee and several other sub-groups of the National Conference on Street and Highway Safety. He also holds memberships in the committee on standardization of traffic signs, signals and markings of the American Engineering Council, the traffic committee of the National Research Council, the traffic committee of the American Road Builders' Association, and the American City Planning Institute.

Digitized by Google

Samuel Riddle Resigns as Vice-President at Louisville

Samuel Riddle, vice-president and secretary of the Louisville Railway, Louisville, Ky., will retire from the organization on Aug. 1. Mr. Riddle went to Louisville in 1910 from the Philadelphia Rapid Transit Company to take charge of the transportation department, as superintendent of transportation, under T. J. Minary, then president.

In 1920, James P. Barnes went to Louisville as president from Schenectady, and Mr. Riddle became vice-president in charge of transportation. In 1928 he was also made secretary.

Mr. Riddle is a native of Pennsylvania. He was graduated from the engineering department of Swartmore. From 1901 to 1903 he was with the United Gas Improvement Company, and then with the transportation department of the

Samuel Riddle

United Electric Railways, Providence, R. I. From 1907 to 1909 he was general manager of the Chicago, South Bend & Northern Indiana Railway. He next went to Philadelphia. He is serving this year as president of the American Electric Railway Transportation and Traffic Association. He has not announced his future plans.

✦

L. K. Starr Resigns from Georgia Power Company

Linton K. Starr has resigned as manager of the public relations department of the Georgia Power Company, Atlanta, Ga., on account of ill health.

In 1921, Mr. Starr resigned as assistant city editor of the *Atlanta Journal* to become executive secretary of the newly formed Georgia Committee on Public Utility Information. In that post he directed the committee's activities, particularly the development of friendlier relationship between the public and corporations serving it by acquainting the one with the problems and purposes of the other. Subsequently he became connected with the Georgia Power Company. To both these posts Mr. Starr brought the advantage of a wide experience, not only in the newspaper profession, but in publicity and public relations work of all kinds. A native Georgian, a graduate of Emory University and a former student of Johns Hopkins University, he has lived practically all his life in Georgia and has been familiar from boyhood with the state and its people.

During the war Mr. Starr conducted an extensive campaign for the government to arouse interest in and encourage the support of the selective service law in Georgia. His other work has included publicity for Emory University, various conventions and a number of business enterprises. He is an experienced advertising writer.

✦

E. F. Thayer with St. Louis Public Service Company

Edwin F. Thayer, formerly with the Philadelphia Rapid Transit Company, Philadelphia, Pa., has become associated with the St. Louis Public Service Company, St. Louis, Mo., as a member of the executive staff with special duties assigned to him from time to time. Mr. Thayer went with the Philadelphia Rapid Transit Company in January, 1927, to become associated with J. M. Shaw, in charge of the public relations activities of the company. Since April, 1929, he has been new-business director of Mitten Men & Management Bank & Trust Company, and Mitten Bank Securities Corporation, Philadelphia. Before going to Philadelphia, he was a member of the editorial staff of ELECTRIC RAILWAY JOURNAL for two years with the title of assistant editor. He is by profession an engineer, having been graduated from the California Institute of Technology with the degree of B.S., in engineering and economics. Aside from serving more than a year in engineering and contracting work, Mr. Thayer's activities have all been in the field of the daily newspaper and the trade journal and in public relations. He was born in Newton, Mass., on May 7, 1901.

✦

London Delegation to Attend San Francisco Meeting

Four members of the London Companies, of which Lord Ashfield is chairman, will attend the A.E.R.A. convention in San Francisco this June. On the return trip, the party will visit the transport companies at Los Angeles, Salt Lake City, Denver, Omaha, Kansas City, St. Louis, Chicago, Detroit, Cleveland, Pittsburgh, Buffalo, Albany, Newark, Philadelphia, Baltimore, Washington, Boston and New York. The members of the party are:

George Shave, operating manager and chief engineer, London General Omnibus Company.

J. H. Williams, divisional engineer, London General Omnibus Company.

A. A. M. Durrant, assistant superintendent rolling stock, London General Omnibus Company.

L. B. Hewitt, mechanical engineer, Metropolitan Electric Tramways, Ltd.

✦

Henry Mozley, general manager of Burnley, England, tramways and buses, has retired after more than 60 years' service with transport undertakings. He has been manager of the Burnley tramways since 1882. He was president of Municipal Tramways Association in 1916-17 and has long been a member of the executive council of that body.

✦

S. J. Peterson, Omaha, Neb., formerly general claim agent for the Union Pacific Railroad, has joined the legal department of the Kansas City Public Service Company, Kansas City, Mo. Mr. Peterson was with the Union Pacific for 40 years.

"Journal" Editors Win Two Business Paper Awards

It is with pride that ELECTRIC RAILWAY JOURNAL records the accomplishments of two of its staff, George J. MacMurray, news editor, and Morris Buck, engineering editor, in winning two of the 1930 Associated Business Papers awards. Mr. MacMurray won the second award for the best editorial and Mr. Buck scored second place for the best article, series of articles or news report. First places in these two classes were won by Samuel O. Dunn, editor *Railway Age,* and Robert L. Davison, *Architectural Record.*

The objective of the A.B.P. awards is to provide recognition of outstanding excellence of business paper editorial work. It is believed the awards so dramatize editorial services that both the editors and their readers gain a wider understanding of the place and purpose of the business press in its relation to industry, trade, commerce, professional activities and specialized services.

Mr. MacMurray's editorial "The Subsidiary as a New Shibboleth," appearing in the Feb. 16, 1929, issue of ELECTRIC RAILWAY JOURNAL, dealt with the matter of political meddling through the advocacy by those outside of the industry of a subsidy as a way out for the railways, and stressed the need on the part of the railways for devising a schedule of fares that would be compensatory and yet not drive away riding. The basis for the judgment of this award was the importance of the subject, clearness of style, sound reasoning and power of influence.

Mr. Buck's series of three articles, starting with the one in May entitled "New Car Survey Shows Increased Net on Many Properties," was a survey showing how the purchase and operation of new cars had materially improved the financial status of 41 railway properties. Statistics were collected and elaborate tables and charts were presented showing the results that have been obtained before and after the introduction of new cars on these railway systems. These articles appeared in the issues of ELECTRIC RAILWAY JOURNAL for May, June and July, 1929. The awards in this class were based on timeliness, accuracy, thoroughness, originality, clearness of expression and usefulness.

✦

James J. Madden, formerly assistant secretary of H. M. Byllesby & Company and a member of the organization for twenty years, the last nine of which have been spent in the New York office where he had general charge of the accounting work of the eastern organization, has been transferred to the Chicago office as assistant secretary and assistant treasurer of Byllesby Engineering & Management Corporation and the Standard Gas & Electric Company.

✦

H. Hobart Porter has been re-elected chairman of the Engineering Foundation, research organization of the national societies of civil, mining and metallurgical, mechanical, and electrical engineers. Mr. Porter is president of the American Water Works & Electric Company, chairman of the board of the West Penn Electric Company, and vice-president of the Queensboro Gas & Electric Company. He is the director of numerous other railroad and public utility enterprises.

Digitized by Google

OBITUARY

James Scullin

James Scullin, 81 years old, pioneer street railway builder, is dead. Born in Helena, N. Y., on March 2, 1850, Mr. Scullin spent his boyhood in Potsdam, N. Y. In 1869 with his brother, Col. John Scullin, he settled in Sedalia, Mo., and when his brother received the contract to build a spur for the Missouri-Kansas-Texas Railway between Sedalia, Mo., and Parsons, Kan., James acted as superintendent of construction. In the late '70s Mr. Scullin located in St. Louis, being active in the development of street railways there. For a while he was superintendent of the so-called Scullin Lines. He retired from this work in the late '90s. He served as a deputy surveyor of customs until elected city marshal. At the end of his second term in that office in 1909 he entered the real estate business. He retired from active business fifteen years ago.

✦

Ambrose Clogher

Ambrose Clogher, who had practiced law in New York since 1920, died suddenly on April 24 at the age of 58. Since establishing his home in New York, Mr. Clogher had represented the New York Railways, the Fifth Avenue Coach Company and other transportation interests before the Appellate Division and the Court of Appeals.

Early in the World War, Mr. Clogher went overseas with the American Expeditionary Force, and from 1918 to 1920 served under the Judge Advocate General of the American Army, presiding over military courts and engaging in other legal work with the American forces.

Born at Washington Mills, N. Y., Mr. Clogher was graduated from Manhattan College, this city, in 1894, and began his legal career in Massachusetts six years later.

✦

W. Emlen Roosevelt

W. Emlen Roosevelt died on May 17, in New York, at the age of 73. Though never so much before the public eye as other members of the Roosevelt family, W. Emlen Roosevelt was one of the most prominent figures in Wall Street, and besides his many activities in railroads, industry and public utilities he was a partner for 52 years in the investment firm of Roosevelt & Sons, one of the oldest houses on the Street.

Unlike other members of the Roosevelt family, there is no record that W. Emlen Roosevelt ever sought or held a public office. He was born in New York and after he was graduated from Harvard entered the firm of Roosevelt & Sons, in which he was a partner at the time of his death. This firm was established in 1797. Theodore Roosevelt, the father of late President Roosevelt and an uncle of W. Emlen Roosevelt, was a partner in the firm.

W. Emlen Roosevelt was widely affiliated with business and banking. He was chairman of the Board of All American Cables, Inc., and a director of Third Avenue Railway, Westchester Electric Railroad, Kingsbridge Railway, Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, New York City Interborough Railway, Belt Line Railway, Union Railway, Dry Dock, East Broadway & Battery Railway, Hastings Railway, New York, Westchester & Connecticut Traction Company, Southern Boulevard Railway, and the Yonkers Railroad.

✦

Thomas A. Cross

Thomas A. Cross, vice-president in charge of claims for the United Railways & Electric Company, Baltimore, and for 39 years prominently identified with the railway system in Baltimore, died on May 13. He succumbed to pneumonia, with which he was attacked less than a week before his death. Mr. Cross was 68 years old. He was unmarried.

Governor Ritchie, of Maryland, and many other men prominently identified

Thomas A. Cross

with the official and business life of the city and state acted as honorary pallbearers at the funeral on May 15.

Mr. Cross was president and chairman of the board of the United during the war. Following the war he was succeeded by Charles D. Emmons, who recently resigned. He was nationally known in the utility field.

Mr. Cross entered railway work in Baltimore in 1891, as a lineman for the old North Avenue Traction Company, one of the first successful trolley lines in the country. Two years later he became connected with the Baltimore Traction Company, which operated the old Druid Hill Avenue cable line. After another two years some of the lines of the city were merged in the Consolidated Railway, and Mr. Cross became superintendent of overhead lines. He also served the company in other capacities.

When the United Railways & Electric Company was formed, Mr. Cross was made general manager. In April, 1911, he became second vice-president and in 1917 succeeded William A. House as president and chairman. For a time after he was succeeded as president by Mr. Emmons, he continued as chairman of the board. Upon the resignation of James R. Pratt to enter private business Mr. Cross became vice-president in charge of claims, filling the office until the time of his death.

Mr. Cross was born in Prince George's County, Md. He was graduated from the Maryland Agricultural College, now the University of Maryland. For a short time after he was graduated and before he entered the street railway field, he was connected with a commercial organization.

✦

Seth W. Baldwin

Seth W. Baldwin, formerly attorney for the Connecticut Company, New Haven, Conn., died suddenly on May 14, in Bethany, Conn. He had been in ill health since early in February, but his death, which was caused by a heart attack, was entirely unexpected. Mr. Baldwin had been connected with the electric railway industry for many years, and was an active participant in the work of the American Electric Railway Claims Association.

Mr. Baldwin was born in Naugatuck, Conn., Dec. 7, 1880. He was graduated from Yale, A. B. 1904, and LL.B. 1906. He was connected with Watrous & Day, New Haven, 1906-07; was claims attorney for the New York, New Haven & Hartford Railroad for Connecticut and New York, 1907-14, and had been attorney for the Connecticut Company since 1914. He was also president of the Morris Cove Company. Mr. Baldwin was awarded the Brady medal for achievement in safety and sanitation on street railways by the American Museum of Safety in 1916.

Funeral services were conducted at Battell Chapel, Yale University, on May 17, the remains being interred in the family plot at Mountain Grove Cemetery, in Naugatuck, Conn.

✦

William A. Whitney, general manager of the Utah-Idaho Central and the Utah Rapid Transit Railroads for six years prior to June, 1923, died in San Francisco on April 17. In 1923 he was made active head of the Mount Hood and Sumpter Valley Railroads in Oregon, as well as manager in charge of operations of the Oregon Lumber Company mills in Oregon and Washington. He continued with the two Utah electric roads at that time as vice-president and director. He was active head of the Eccles lumber and railroad interests in Oregon and Washington. Mr. Whitney went to Ogden as head of the electric roads in 1917 from the position of superintendent of transportation for the Union Pacific. Prior to that time he was superintendent of several different divisions of the Union Pacific and from 1911 to 1914 was superintendent of the Sacramento and Oakland divisions.

✦

Charles R. Johnson, an employee of the Triple Cities Traction Company, Binghamton, N. Y., whose service dated back 45 years to the days of the horse car, is dead. He was 83 years old. Mr. Johnson was born in Glen Castle and came to Binghamton 50 years ago. He entered railway work in the days when separate companies served various parts of the city by horse car and he drove over South Side and North Side lines. Later these lines were amalgamated in the Binghamton Railway, and with the coming of the trolley he was assigned operating duties, a place he held until a few years ago, when less exacting duties were arranged for him by the Triple Cities Traction Company, successor to the Binghamton Railway.

Digitized by Google

INDUSTRY MARKET AND TRADE NEWS

Milwaukee Company Receives Ten Two-car Trains

Ten new two-car trains especially designed for suburban service, have been purchased from the St. Louis Car Company by the Milwaukee Electric Railway & Light Company for its South Milwaukee line. The first of these trains began operation in rush-hour service between the Public Service building and Grange Avenue, Cudahy, effective Tuesday, April 29. Their operation through to South Milwaukee is contingent on arrangement of a loop track in that suburb.

The new trains are of the most modern type, with steel body construction, streamline appearance and latest features for passenger comfort. They are built on the three-truck principle, with a passageway between cars open for use at all times. Entrance and exit doors are at the front end of the second car, and an emergency exit is provided at the front of the forward car. Special truck construction reduces the over-all height of the new trains, and the exterior color scheme of chrome yellow and green accentuates their long, low appearance. Interior head-room has not been reduced, however, and seats are provided for 119 passengers. Smoother riding qualities are calculated to result from the special form of suspension and lower center of gravity.

The forward car has leather upholstery, and the rear car, on which smoking will be permitted, has standard rattan seats. Otherwise the two cars are identical, with electric heating, special insulation, semi-indirect lighting, rubber-tile floor covering, wide aisles and improved exhaust ventilators. Improved acceleration and braking are provided, with six 50-hp. motors, as well as air brakes applying to all twelve wheels. The trains are of the single-end type, requiring loop facilities at the terminals of the line.

Ten Cars for Knoxville Power & Light Company

Ten double-truck, double-end cars of the arch-roof type, with all steel bodies, have been ordered by the Knoxville Power & Light Company from the Perley A. Thomas Car Works, Inc., of High Point, N. C., delivery to be made some time in August.

Equipment specifications are as shown below:

Length over all	39 ft. 4 in.
Length over body posts	29 ft. 3 in.
Truck wheelbase	20 ft. 0 in.
Width over all	8 ft. 5 in.
Air brakes	Westinghouse Air Brake Co.
Armature bearings	Plain
Axles	A.E.R.E.A. standard type E2
Car signal system	Faraday
Compressors	Westinghouse DH 16
Conduit	Flexible
Control	General Electric K-75
Curtain fixtures	Adams & Westlake
Curtain material	Pantasote, double faced
Destination signs	Keystone
Door mechanism	National Pneumatic Co.
Doors	Folding
Fare boxes	Johnson
Finish	Enamel
Floor covering	Linoleum
Glass	Plate
Hand brakes	Peacock staffless
Hand straps	Buffalo type
Heaters	Consolidated Car Heating Co.
Headlights	Golden Glow NRM 96
Headlining	Haskelite
Interior trim	Cherry
Journal bearings	Plain
Journal boxes	A.E.R.E.A. standard
Motors, four	G. E. 265
Painting scheme	Cream and orange
Roof material	Haskelite, canvas covered
Sash fixtures	Adams & Westlake Co., brass sash
Seats	Hale & Kilburn, No. 392-A
Seating material	Green plush
Steps	Folding
Step treads	Kass
Trolley	Ohio Brass Co.
Trolley base	R. D. Nuttall Co., U. S.-20
Trucks	Brill 76-E-1-X
Ventilators	Nichols Lintern Type C
Wheels, type	Steel, diameter 26 in.
Wheelguards or fenders	H. B. Wood slat

Delivery of Detroit Cars to Start in June

Additional details of the 130 cars recently ordered from the St. Louis Car Company by the City of Detroit Department of Street Railways are now available. The new cars, which will be of semi-steel construction of the arch-roof type will have an over-all length of 48 ft. 5 in. They will be single-end, double-truck, front-entrance, center-exit, arranged for two-man operation. Seats will be provided for 52 passengers. It is understood that the order for air brakes, control apparatus, and motor equipment, of which there will be four to each car, will be divided equally between the Westinghouse and General Electric Companies. Steel wheels of 26-in. diameter will be provided.

Other specifications are as follows:

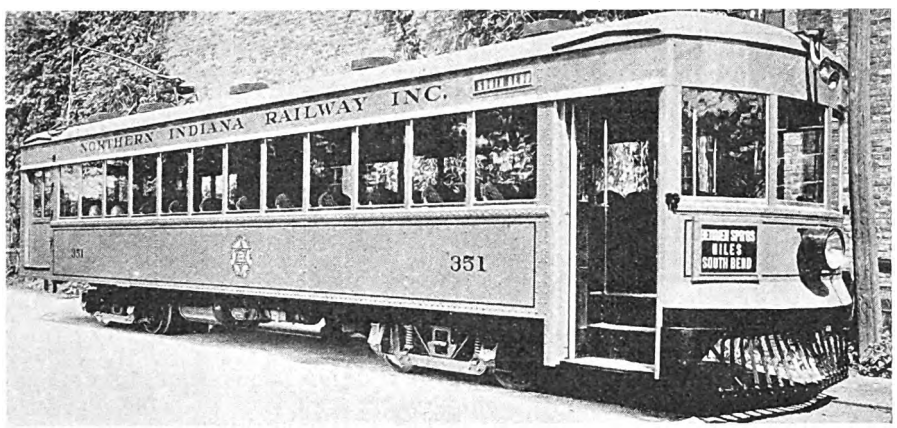
Curtain fixtures,
Curtain Supply Company's No. 88
Curtain material...Double faced Pantasote
Glass.....Libby-Owens plate
Headlining.....⅜ in. Agasote
Lamp fixtures,
Electric Service Supply Company
Sash fixtures.....O. M. Edwards, metal
Seating material,
Full grain brown Spanish leather
Step treads.....Kass, No. 14
Trolley catchers.....Ohio Brass No. 13141
Trolley bases.....Ohio Brass Form 5
Ventilators....12 Railway Utility Company
Honeycomb vent
Wheelguards .....H-B type

Mercedes Benz Company, Inc., announces the appointment of the National Railway Appliance Company, 420 Lexington Avenue, New York City, as their representative for Diesel engines, and buses and trucks equipped with Diesel motors.

New Interurban Cars for Northern Indiana Railway

Carrying out a rehabilitation program promised at the time of the company's reorganization, the Northern Indiana Railway, Inc., South Bend, Ind., has ordered ten interurban cars from the Cummings Car & Coach Company, Paris, Ill. The cars, which are designed for one-man operation and which are expected to attain a speed of 60 m.p.h., will be ready for delivery by June 1, and will replace the present interurban cars which carry crews of two men.

The new cars are well proportioned, with streamline body design, and are divided into three compartments, main passenger, smoking, and baggage, with a total seating capacity of 51, including the upholstered folding seats in the baggage section. Inside finish is walnut, with chromium plated metal trimmings. Total weight is 42,000 lb. Over-all length is 47 ft. 2 in., width over-all, 8 ft. 10 in., and height, rail to trolley base, 10 ft. 8 in.



One-man cars of attractive design replace heavier rolling stock on Northern Indiana Railway

Motor and control equipment consists of four Westinghouse No. 516, 50-hp. motors, and K-75 tapped field control. Westinghouse air brakes and safety control are provided. Trucks are Cummings Car & Coach Company's No. 64, equalizer type, with 4¼ in. by 8 in. journals and 28-in. wheels. Wheelbase is 5 ft. 6 in. Other details of specifications are as follows:

Armature bearings	Plain
Car signal system	Faraday
Curtain fixtures	Excel
Curtain material	Pantasote
Destination signs	Keystone
Door mechanism,	National Pneumatic Company
Doors,	Front folding; rear sliding for baggage
Floor covering	Tucolite
Gears and pinions	Westinghouse
Hand brakes	Pittsburgh No. 35
Heaters	Consolidated
Headlight	Ohio Brass Company
Headlining	Agasote
Journal boxes,	Cummings Car & Coach Company
Lamp fixtures	Dayton, dome type
Paint,	Enamel outside; strain and varnish inside
Roof material	Wood, canvas covered
Sash fixtures	A&W brass, chromium plated
Seats	American Wicker Works
Seat spacing	34 in.
Seat covering	Plush and leather
Trolley retriever	Knutson No. 5
Trolley base	Ohio Brass Company
Ventilators	Railway Utility Company

Digitized by Google

Specifications of Baltimore Cars

Complete specifications of the 150 cars now under construction for the United Railways & Electric Company, of Baltimore, are now available. As previously stated in this magazine, 100 of the bodies are to be constructed by the J. G. Brill Company, at Philadelphia, while 50 bodies will be supplied by the Cincinnati Car Corporation. Equipment specifications, which are substantially the same in both orders, are as follows:

Air brakes	Westinghouse Traction Brake Company
Armature bearings	Plain
Axles, 4¼ in.	Bethlehem Steel Company
Car signal system	Electric Service Supply Co., No. 27801 CB push button
Compressors	Westinghouse DH-20
Conduit	Flexible
Control	75 Westinghouse "VA -75 GE. "PCM"
Couplers	Portable draw bar
Curtain fixtures	Adams & Westlake No. 88
Curtain material	Pantasote double face No. 80
Destination signs	Hunter
Door mechanism	National Pneumatic Company
Doors	Folding
Energy saving device	Economy meter
Fare boxes	Johnson
Floor covering	3/16-in. battleship linoleum
Gears and pinions, Tool Steel Gear & Pinion Company	
Glass	Sheet glass, double thick
Hand brakes	Peacock staffless
Heaters	Railway Utility Company's panel type
Headlights	Electric Service Supply Co. FH-916
Headlining	Agasote
Interior trim	Wood and metal
Journal bearings	J. G. Brill, plain
Journal boxes	J. G. Brill
Lamp fixtures	Electric Service Supply Co., dome
Motors, four, Westinghouse 516-GE-301, inside hung	
Registers, Johnson Electric and International R-7	
Roof type	Arch
Roof material	Wood, canvas covered
Safety car devices, National Pneumatic Company	
Sash fixtures, Adams & Westlake—O. M. Edwards	
Seats	J. G. Brill
Seat spacing	31½-in.
Seating material	Leather
Slack adjusters	Brill automatic
Steps	Stationary
Step treads	Kass
Trolley catchers	Earll No. 10
Trolley base	Ohio Brass Company
Trolley wheels	Ohio Brass Company
Trucks	J. G. Brill, 177-E 1
Ventilators	Railway Utility Company
Wheels, type	Rolled steel, diameter 26 in.
Wheelguards or fenders	H. B. life guard

Recent Bus Orders and Deliveries

Conspicuous among recent orders for automotive equipment is that of the City of Detroit Department of Street Railways for six trolley buses and 50 40-passenger, gas-electric, metropolitan type buses. The trolley buses will be from the Twin Coach Company, and delivery is expected by the first of June, but the order for buses is being held up pending further consideration by the City Council.

Twin Coach Company has made delivery of 29 trolley buses and two urban-type coaches to Chicago Surface Lines. Los Angeles Motor Coach Company and the San Diego Electric Railway have each received two of the Twin Coach urban-type buses.

Recent White deliveries include one Model 65 bus to the Denver Tramway Corporation, five Model 65A buses to Montreal Tramways, and one 65A bus to Southern Public Utilities, of Winston-Salem, N. C. The Boston, Worcester & New York Street Railway has placed in express service, Boston to Worcester, five 37-passenger de luxe White buses, while four 29-passenger buses have been added to the Boston-New York service.

Among deliveries reported by the Mack-International Motor Truck Corporation are two Model AB 25-passenger buses for city service to the Lincoln Traction Company, Lincoln, Neb., one bus of similar type to the Fonda, Johnstown & Gloversville Railroad, one Model AB 23-passenger bus for intercity service to the Oklahoma Union Railway, Tulsa, Okla., and one Model BC 33-passenger, city-type bus to the Nashua Street Railway, Nashua, N. H.

New Cars for Mobile, Ala.

The Mobile Light & Railroad Company recently received seven all steel, one-man, single-truck cars for city service, of which four were supplied by the Perley A. Thomas Car Works, Inc., and three by the American Car Company, of St. Louis. The Thomas cars are of the double-end type, while those supplied by the American Car Company are single-end. Dimensions and weight are substantially the same, but detail specifications differ in certain respects.

The cars will have an over-all length of 29 ft. 9 in., an over-all width of 8 ft. 3 in., and a truck wheelbase of 8 ft. 6 in. Weight will run about 19,000 lb. Seating capacity is eighteen passengers.

Specifications are as follows:

Builder of car body	Perley A. Thomas Car Works	American Car Company
Air brakes	Westinghouse Air Brake Company	Westinghouse Air Brake Company
Armature bearings	Plain	Roller
Axles	A.E.R.E.A. standard	Brill
Car signal system	Faraday (Electric Service Supply Company)	Faraday
Compressors	Westinghouse DH-16	Westinghouse DH-16
Conduit	Flexible	Flexible
Control	General Electric K-35	Westinghouse K-63-G
Couplers		
Curtain fixtures	Adams & Westlake	Curtain Supply Co. No. 49
Curtain material	K-2 Pantasote	K-2 Pantasote
Destination signs	Keystone	Hunter
Door mechanism	National Pneumatic Co.	National Pneumatic Co.
Doors	Folding	Folding
Energy saving device		
Fare boxes	Johnson DM-4	Johnson DM-4
Finish	Enamel	Vitralite enamel
Glass	Plate	Plate
Hand brakes	Drop handle type	American Car Company
Hand straps	National Railway Appliance	None
Heat insulating material		
Heaters		
Headlights	Ohio Brass type WDF	Crouse-Hinds No. 28519
Interior trim	Mahogany	Mahogany
Journal bearings	Plain	Plain
Journal boxes	A.E.R.E.A. standard	Brill
Motors	G. E. 265	Westinghouse 510-E
Painting scheme (color used)	Traction orange	Traction orange
Roof type	Arch	Arch
Roof material	Wood, canvas covered	Wood, canvas covered
Safety car devices		
Sash fixtures	O. M. Edwards A-525-6	O. M. Edwards A-525-6
Seats		Brill "Waylo" reversible
Seat spacing		28 in.
Seating material	Cherry	Mexican mahogany
Slack adjusters		Brill, air operated
Steps	Folding	Folding
Step treads	American Abrasive	Feralun
Trolley	Earll No. 10	Earll No. 10
Trolley base	Nuttal 20-A	U. S. No. 20-A
Trolley wheels	G. E. Feist	G. E. Feist
Trucks	Brill 79-E-2	Brill 79-E-2
Ventilators	Brill exhaust type	Brill exhaust type
Wheels, type	Rolled steel Diam. 26 in.	Rolled [illegible]
Wheelguards or fenders	H. B.	H. B.

Electric Railway Material Prices—May 24, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	13.00
Lead, cents per lb.	5.50
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	4.95
Tin, Straits, cents per lb.	31.75
Aluminum, 98 to 99 per cent, cents per lb.	24.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	41.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.20
Somerset mine run, f.o.b. mines, net ton	2.00
Pittsburgh mine run, Pittsburgh, net ton	1.40
Franklin, Ill., screenings, f.o.b. mines	1.55
Central, Ill., screenings, f.o.b. mines	1.45
Kansas screenings, Kansas City	1.85

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ⅝ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.08
Angles bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.80
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.40

Hardware—Pittsburgh

Wire nails, base per keg	$2.20
Sheet iron (24 gage), cents per lb.	2.60
Sheet iron, galvanized (24 gage), cents per lb.	3.25
Galvanized barbed wire, cents per lb.	2.85
Galvanized wire, ordinary, cents per lb.	2.80

Waste—New York

Waste, wool, cents per lb.	10.00 to 15.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	9.00 to 12.00
Colored	6.00 to 10.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	14.2
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	0.54
Putty, 100 lb. tins, cents per lb.	5.725

Wire—New York

Copper wire, cents per lb.	14.00
Rubber-covered wire, No. 14, per 1,000 ft.	$5.30
Weatherproof wire base, cents per lb.	14.75

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.25
Light copper, cents per lb.	8.75
Heavy yellow brass, cents per lb.	5.80
Zinc, old scrap, cents per lb.	2.25
Lead, cents per lb. (heavy)	3.75
Steel car axles, Chicago, net ton	$16.25
Cast iron car wheels, Chicago, gross ton	14.25
Rails (short), Chicago, gross ton	16.00
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	7.50

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

New York, June 14, 1930
Volume 74 *Number 7*

Annual Convention Number

Improving Design to *Improve Service*

TODAY, more than ever before, the interest of electric railway men is directed to improving service by improving the design of equipment and physical plant. Among the many problems before the industry none is more vital than this. True, traffic congestion and control is a live issue. Important questions of valuation and rates of fare are now under consideration. Relations between management and employees are being studied intensively. Methods of publicity and merchandising are prominent in the minds of many operators. Means to cut costs are receiving concentrated attention. But the cornerstone upon which rests the whole structure of electric railway progress is the design of equipment and physical plant.

Many advances have been made in recent years. More will be made in the years to come. Where are these trends leading? Are these various improvements separate and unrelated, or are they parts of a definite and correlated program? While at first glance the relationship between the many different developments may not be evident, deep down below the surface practically all of them will be found to have the common objective—to improve the quality of the transportation service rendered.

OF PARTICULAR interest at the present time are the improvements being made in the electric rail car. For some years the industry has been awake to the need of modernizing its rolling stock. While other forms of transportation had undergone revolutionary alterations, the car, the heart of the electric railway, remained unchanged. It was realized that the electric railway could not continue to hold its rightful place in the transportation field unless the car was brought up to date.

Modernization plans inaugurated during this period are now beginning to bear fruit. Great strides have been made in improving the appearance of cars. Certainly the utility of the vehicle is not impaired by making it attractive. Many improvements have been made which provide greater comfort and safety for the passenger. Operating speeds have been increased by means of more rapid acceleration and braking. Effective means to lessen vibration and noise have been developed by scientific study. Though these may be small things in themselves, in the aggregate they constitute an important contribution toward improving the quality of service.

LESS SPECTACULAR, perhaps, but none the less important have been the improvements in track construction methods and machinery. Demands on the track structure under conditions existing today differ widely from those of a few years ago. To meet these new conditions, engineers have effected far-reaching changes in design. Likewise, in the field of power conversion and distribution for the electric railway, a variety of equipment is available today which is vastly more efficient and more economical than that in general use a decade ago.

Spectacular growth of our cities has created new problems. Population is increasing and at the same time is spreading over a much wider area. The distance between home and work is becoming ever greater. Heavier demands have been placed upon existing rapid transit facilities, and new facilities have become necessary. Efficient operation of these lines demands improved equipment.

Along with the intensive service in the congested area, there has developed a demand for service in many less densely populated districts. Here the motor bus and the trolley bus have entered the picture. Like the electric car, both have undergone many changes in design which have greatly increased their usefulness.

From every standpoint demands made upon public transportation service are far different today from those of a few years ago. These conditions present a challenge to both the transportation operator and the manufacturer of equipment. That the challenge to improve service will be met there can be no doubt. But that it shall be successfully met demands untiring effort to improve design.

Digitized by Google

How the Convention Will

Benefit the Industry

By

PAUL SHOUP

President Southern Pacific Company
President American Electric Railway Association

THERE is no activity in our national life more important and all-concerning than transportation. For this reason the entire country has a direct interest in the 49th Annual Convention of the American Electric Railway Association. More than 2,000 members of the association from all over the United States and Canada will gather in San Francisco June 23 to 26. These men, actively engaged in the transportation of people and merchandise, will bring to the convention the story of their problems and accomplishments and from the discussion of these topics all of us will receive helpful suggestions and healthy stimulation.

A convention is an institution for the exchange of ideas. The program of the 49th Annual Convention of the American Electric Railway Association covers a wide range of important and timely subjects. Those who come may be sure that the time given to attending this gathering will be well spent.

The electric railway industry should benefit by this convention in other ways as well as from the discussion of its problems. Among those who attend the convention will be representatives not only of the industry itself but also of many western communities. Governors of states, mayors of cities, members of legislative bodies, educators and other leaders in public life have been invited to attend and we have reason to believe that many of these invitations will be accepted—with benefit, I am sure, both to the electric railway industry and to the communities they represent. Understanding is an important factor in progress and there is no better way to develop understanding than by giving the party of the other part a seat at your council chamber.

The development of closer acquaintanceship among ourselves is another benefit of a gathering such as this convention. In the days of the Don, California hospitality was a sacred rite. Those were the days of which the historian Bancroft wrote: "A man could ride from San Diego to Sonoma without a coin in his pocket and never want for a roof to cover him, a bed to sleep on, food to eat, and even tobacco to smoke." In those days transportation facilities were of the four-legged variety and there were no hotels. The visitor who galloped up to the door in the late afternoon expected to spend the night as a guest—and was never disappointed. His horse or mule was given a rubdown and a well stocked stall. The visitor was escorted to the guest chamber where his host waited on him with a basin of water and clean towels. These the host carried himself, but a queue of servants walked behind the master to indicate that had he not wished to show his guest the courtesy of personal service, he could have delegated its performance to hired retainers. When the guest awoke in the morning he found on his bedroom table a clean shirt and a jar containing money—both for his use if he needed them. If his horse was still tired he was given another horse which he exchanged for his own later on the return journey.

On this and similar old Spanish customs, California hospitality was founded. It is the same today as it was 200 years ago, and judging by the plans which have been made for entertaining the visitors to the A.E.R.A. convention, they will long remember their visit to the "land of the Don."

Digitized by Google

Co-operative Effort

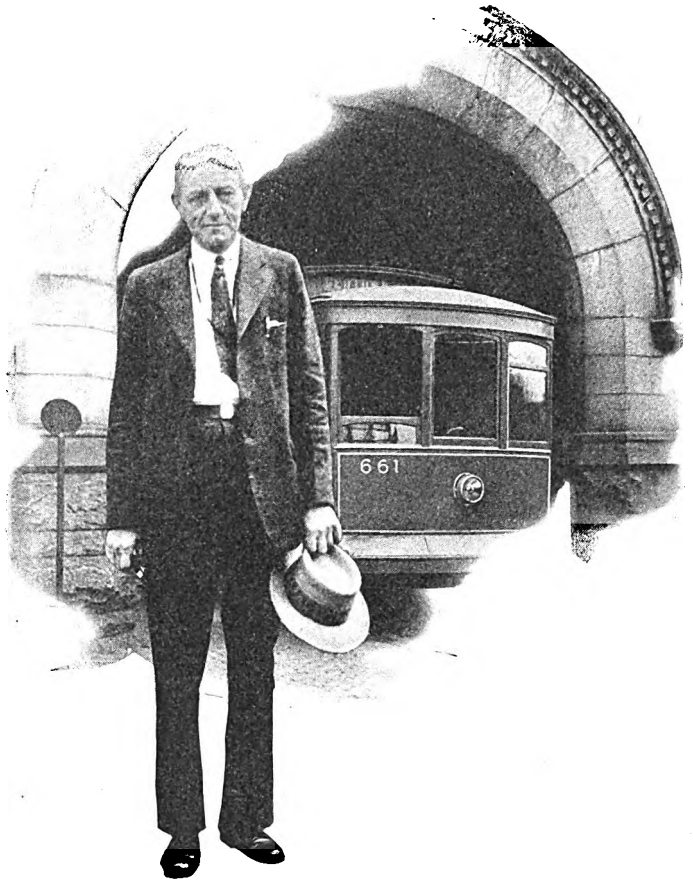
Is Greatest Need

By

J. H. HANNA

President Capital Traction Company

First Vice-President
American Electric Railway Association



SERVICE furnished by the urban and suburban transportation companies is absolutely essential to the welfare of American cities, and if it should be eliminated or seriously crippled the public as a whole would suffer grievously. The business is no longer a monopoly, if it ever was, and while unregulated competition should and must be curtailed, the industry's plans for the future must be based on meeting rather than eliminating competition.

There are probably no more important matters affecting urban transportation agencies today than traffic congestion and the various plans for preventing or correcting it. Unfortunately, many of the studies and plans for improving the traffic situation in cities have been based on a consideration of the movement of vehicles rather than the movement of passengers, resulting in entirely inadequate provision being made for mass transportation vehicles. Parking regulations, traffic lights and signals should be considered on a basis of the greatest good to the greatest number of individuals to be transported. An attempt to handle mass transportation by individual vehicles, either private cars or taxicabs, would result in practical stagnation unless street capacities are doubled or quadrupled.

It is noticeable that in those cities where engineers of transportation companies take an active part in the drafting of traffic regulations and establishing signal systems, the results have been much more satisfactory than in cities where the companies' assistance has not been utilized.

The American Electric Railway Association can do nothing which will be of more benefit to its members and to the public at large than to impress upon municipal authorities and city planners the fact that mass transportation vehicles must be given more consideration in traffic regulation. The vast majority of people now depend upon public transportation service and must continue to do so if traffic conditions are not to get very much worse instead of improving.

All of these factors emphasize the importance of co-operative effort and call attention to the activities of the association and their importance to every operating and manufacturing company. The present tendency in the association's work is towards detailed technical study of the various elements of the business and it is through such detailed technical study that the industry can improve the value and attractiveness of the service which it renders, and thereby get back customers it has lost.

The Committee on Fare Structures, recently established, has great possibilities. The flat fare for city companies has been considered practically inviolate in spite of numerous efforts made to break away from it in the last ten or twelve years. There is no doubt that the flat fare is economically unsound and has driven away much profitable business. Many and varied plans have been suggested and tried out for the establishment of a more scientific fare scheme but none has so far been entirely satisfactory. It is quite possible that this committee's work may go far towards helping solve the industry's difficulties. In any event, the necessity for co-operative effort has never been so great as at the present time.

Digitized by Google

Waterfront and downtown business section of San Francisco as seen from the bay

San Francisco, Scene of the 49th Annual Convention of the American Electric Railway Association

Night scene of the convention city

Digitized by Google

Market Street, with its four parallel tracks, is the main business thoroughfare of San Francisco

DESIGN of street cars is undoubtedly one of the important factors in revamping service to satisfy more nearly present-day demands. Any increase in comfort features, consistent with carrying capacity and loading requisites, is of vast importance. Any improvements contributing to speed, noise reduction and smoothness likewise raise the street car ride in the estimation of the public.

SAMUEL KAHN
President Market Street Railway
San Francisco, Cal.

Digitized by Google

IMPROVEMENT *in the* RIDE

Is the Most Effective Stimulant of

Public Interest

By

CHARLES GORDON

Managing Director
American Electric Railway Association

ALTHOUGH there is much room for optimism in the electric railway industry at the present time, prompted by the general feeling that its major problems are being attacked with renewed vigor, we should not minimize the great task before us. Eleven years have elapsed since the close of the war, but this industry has not been able to balance its operating budget in the true sense of the word. Its net earnings have been subnormal; the return upon its capital investment has been inadequate, and it has lost ground in number of passengers carried in relation to population increase. In consequence of these conditions, new capital can be secured only with difficulty and at high cost. There is a general feeling, not only in the minds of bankers and investors, but also on the part of the public at large, that the future of the industry is highly problematical.

News of the abandonment of electric railway lines is widely disseminated, and the significance thereof magnified beyond all reason. A large section of the public believes that the future useful life of our surface transportation systems will be comparatively short, and that the electric railway car will soon disappear as the stage coach and the canal boat have done. This lack of confidence in the future of our industry affects us adversely in attempting to attract the capital needed for refinancing and for improvements.

Pleas for public co-operation with respect to franchises, taxes and traffic regulations, as well as for consideration of public along with private transportation in city planning and highway construction do not attract public interest because the average man is not inclined to be interested in an industry which he considers obsolete. There is a strong tendency to overlook the plight of community transportation and of the vital part which it plays in the life of modern cities. This is attributable in large measure, if not entirely, to the impression of obsolescence which is created by the character and condition of the equipment which we operate.

All studies of the requirements of the industry lead to the inevitable conclusion that the cars which we operate represent an important phase of our problem. The industry has for several years been aware of the evils attendant on the operation of the large number of obsolete and heavy cars that are in service. In considering the economics of replacing a large proportion of its present equipment, however, it was faced with the fact that the type of equipment currently offered did not

Digitized by Google

meet present-day traffic requirements to the degree which would warrant the investment. Nor was the evidence as to the economies which would result from the operation of this equipment sufficiently impressive to lead to the belief that replacement with such rolling stock would re-establish the railways upon a firm foundation.

Three interested groups must be considered in any study of the requirements of present-day transportation equipment: the public, the electric railway and the manufacturer. Of all the objectives to be attained in car design, probably the most important are those which are necessary to meet the demands of the public. In this respect, the electric railways must compete with individual automobile transportation, and their cars must be suitable for that purpose. They must meet the requirements of modern conditions, both in their performance and in the impression which they make on the public. They must be in keeping with their surroundings in the modern city. They must be able to keep up with other traffic on the street, and must meet the demand for quick transportation. They must, by their very appearance and by the impression which they make on an observer, create the desire to ride in them. There must not be the slightest hint of being out of style. The American public refuses to be associated with anything which even gives the impression of being out-of-date, and it will tolerate such a thing only so long as it is forced to do so. Future rolling stock must be quiet in operation. It must be smooth and pleasant to ride in. It must be comfortable, convenient, and easy to use. It must, in fact, meet the automobile on its own ground, for the public has become automobile-minded.

From the standpoint of the railway, it must be able to accomplish all these things at the lowest possible cost. In fact, the cost must be far below that of individual transportation. Managements are faced with the problem of providing satisfactory service with a fare which, in most instances, is inadequate to provide the revenue needed to insure adequate returns to investors. Therefore, the question of reducing cost is a vital one to the continued operation of their systems. Considering cost, the car must be light, but care must be taken not to reduce the weight below the point where the high initial cost, through the use of expensive alloys and other costly materials, overbalances the saving resulting from the lighter weight made possible thereby. Its structure must be as simple as is consistent with necessary strength. The possibilities of weight and resulting cost reductions seem to be the most attractive in trucks, motors, electrical control apparatus, braking equipment and miscellaneous apparatus. The many specialties which go into a car, such as seats, doors, trolley retrievers, headlights, etc., seem to offer further possibilities for simplifying the design and reducing the cost.

From the manufacturer's point of view, the many improvements demanded must be made in face of a continual clamor for reduced first cost. The very conditions under which cars are built and sold militates against the accomplishment of this objective. Car building has been largely a contracting rather than a manufacturing business. A builder influences the details of construction, but rarely sponsors the complete unit as a distinctive manufactured product. It has been suggested that the car builders should take the initiative in developing cars to be sold as other manufactured products are sold. On the other hand, some builders hold that street cars cannot be sold in that way because the operating companies will continue to insist upon specifying their own design. Only experience can prove or disprove this point. It is worthy to note, however, that bus manufacturers have succeeded in selling to transportation companies, many of them electric railways, models of their own design.

To meet the public demand for speed in transportation, cars are needed which, as nearly as possible, will accelerate and stop as rapidly as the best powered private automobile on the street and which have a sufficiently high free-running speed to hold their place in traffic. At the present time we have no standards by which to judge the speed of the street car, except by comparing it with its real competitor—the private automobile.

The ideal characteristic curves of acceleration and retardation for a street car have never been determined, nor has the industry undertaken to find the maximum values which may be considered practical. The rates, no doubt, in the end will be controlled by the ability of the standing passenger load to accommodate itself to rapid movement. This involves not only standing passengers during the rush hour, but also passengers walking from the doors to the seats, or vice versa, while the car is moving. The maximum attainable rates of acceleration and retardation cannot be achieved in any city until the public has been educated to conform to higher rates than now prevail. The present-day public is alert and is quick to adjust itself to new conditions.

Transportation men disagree on the relative merits of speed and frequent headway in attracting riders. Both are important. In this respect, there was much discussion two years ago about the use of smaller units brought about by the development of experimental four-wheel cars. Undoubtedly, the idea of a comparatively small unit, operated on a short headway by one man is fundamentally sound for a great many lines in many cities. Only when traffic densities go up considerably above the average are larger units necessary or justified.

The electric railway man has always been susceptible to the temptation to use large units. It seems such a simple way to reduce the cost per seat, or per passenger carried. But of what good is a reduction in cost, if it is achieved by driving away business? Frequency of service, along with speed, is necessary to increase the volume of riding. But even from the standpoint of speed, small units have an advantage over large cars, for speed is affected by the number of stops. The smaller the total load carried on a single vehicle, the fewer will be the number of stops which it is required to make. Putting this whole matter in another way: the smaller the individual unit that is operated, the closer does the service given approximate that of the individual automobile.

The load factor on the system is all too often overlooked in yielding to the temptation to make sure, when selecting new cars, that they are ample in size. The use of larger equipment in the rush hour is, of course, frequently required, but there are cars now available on most properties for that purpose, and in any replacement program, first consideration should be given to equipment for all-day service. This question of the proper size of cars is an important one in considering rolling stock.

The idea behind the single-truck safety car was sound for a great many lines in many cities, so far as its small size and the implied objective of frequent headway were concerned. But the limitations of the existing types of four-wheel trucks were a serious handicap. The appearance and riding qualities suffered. The car looked too much like what it really was—cheap transportation. It is one of the idiosyncracies of human nature that though

Digitized by Google

we demand economy and an attractive price, we refuse to buy a thing that looks cheap if we can possibly find the money to buy something that looks more luxurious.

Improvement in the proportions, lines and general appearance of street cars to the end that they may be in keeping with their surroundings in modern cities is a second very important objective from the standpoint of the public. Here again the standard of comparison is the automobile. The principal object seems to be to make the street car a more graceful looking and attractive conveyance. The same general objective applies to the interior. There must be proper balance between attractiveness and utility. The design, equipment, fittings and decorations should be in keeping with the purpose for which the vehicle is intended; namely, the mass transportation of passengers in cities.

Only during the past few years have we been giving the question of car appearance serious consideration. In this we have been forced to feel our way slowly, because relatively little attention was formerly given to the appearance of street cars. We are beginning to ask the engineers to fit structural details into a design to produce a given appearance, instead of letting the latter take care of itself after the structural elements are determined.

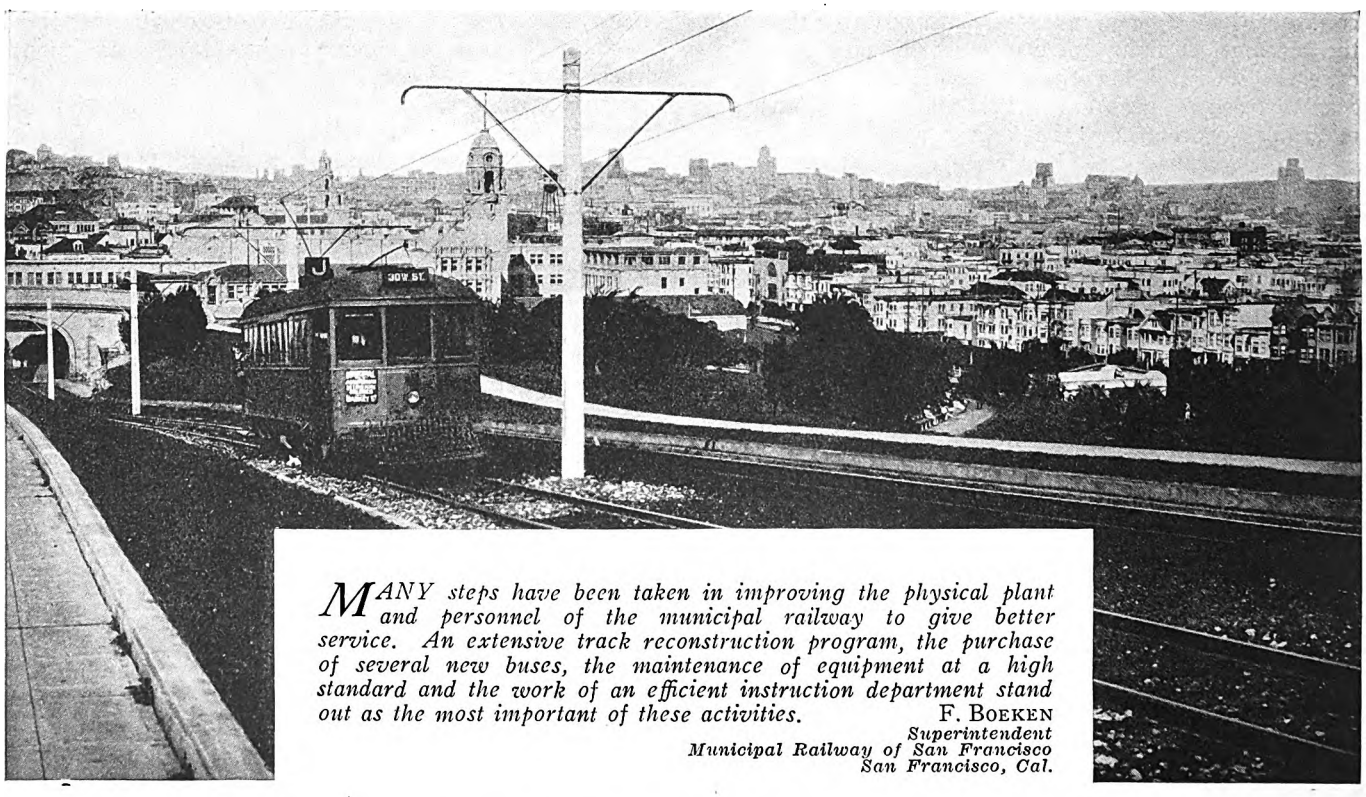
In answer to the steady demand for a smooth and quiet ride, the manufacturers have developed a number of trucks, differing in many respects from the older conventional types. The objectives sought in the designs are reduced weight and noise, faster and smoother starting and stopping with lighter equipment, and reduced unsprung weight. Reduction in unsprung weight is expected not only to improve the riding materially and save wear on the car itself, but also to reduce both noise and wear of expensive special work and tracks. Of almost equal importance is the arrangement of the springs.

Noise has been reduced in some of the newer models by more accurate fitting of gears and other parts, by simplifying the design, and by insulating the springs, brake rigging and other parts from adjoining portions of the structure. The introduction of higher-speed motors made possible by the newer arrangements to support the motors on the truck frame instead of on the axle, has led to the development of several new types of drives. The single-reduction unit, the double-reduction unit and the worm-gear drive are all available for use. The present need seems to be merely the perfection of experimental models and the building up of a record of experience with them that will insure their practicability for the severe conditions of regular service.

From the standpoint of the operator, one of the most important objectives to be attained in car design is a substantial reduction in operating and maintenance costs. Both are largely controlled by the design, age, condition, performance, weight and first cost of the equipment which is operated. The other important operating elements entering into the problem are labor, track maintenance and power. We cannot hope to reduce the cost of labor except as we use labor more efficiently by increasing car-miles per man-hour through improvement in the performance of cars. We have relatively little opportunity of decreasing track costs, except as we are able to reduce wear and tear and maintenance through reduced weight of cars, better suspension design and reduced unsprung weight. Likewise, the largest opportunity for reduction in power cost is afforded by reducing the weight and increasing the efficiency of our cars.

It is imperative that the cost of new cars be brought down to a point where a retirement period of perhaps ten years becomes practicable. Otherwise, with a continuation of the present rate of progress in automobile design, it is probable that new equipment, even of the most modern type that could be expected to be available within a reasonable time, would be entirely obsolete before it could be retired.

A ride through Mission Park over the private right-of-way of the Municipal Railway affords an unusual view of San Francisco



MANY steps have been taken in improving the physical plant and personnel of the municipal railway to give better service. An extensive track reconstruction program, the purchase of several new buses, the maintenance of equipment at a high standard and the work of an efficient instruction department stand out as the most important of these activities.

F. BOEKEN
Superintendent
Municipal Railway of San Francisco
San Francisco, Cal.

Digitized by Google

Simplicity in line and contour, as well as carefully balanced proportions, reflect efficiency and utility in the new Youngstown cars

Obtaining an

Attractive Appearance

with *Simplicity* and *Utility* in Design

By

R. N. GRAHAM
Manager of Railways
Penn-Ohio System, Youngstown, Ohio

APPEARANCE, external and internal, is a very important feature in the units of modern city transportation. There has been a general tendency in all American cities to devote thought to the impression the city and the component parts of it make upon the individual. Modern buildings are designed with an eye to beauty as well as to mere utility. The urban transportation company can not be alien to the general movement toward improved city appearance.

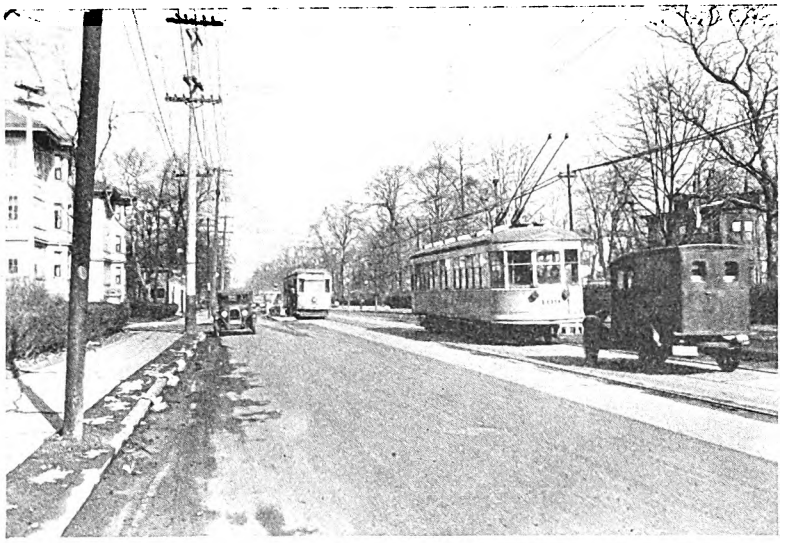
It has been found that true beauty is harmonious with efficiency and utility. Something added merely for decorative effect we view as "gingerbread" and "Victorian." On the other hand, the harmony in line and contour which reflects efficiency and utility requires studied thought and plan.

The beautiful simplicity of the exterior of a British or Continental locomotive does not in the least interfere with such a locomotive being an efficient piece of machinery. Neither do the long, sweeping lines of perspective of the modern skyscraper interfere with a most economic use of the cubic space contained in it. There has been a tremendous improvement in the appearance of automobiles in the past ten years. This is not the result of adding ornamental appendages but rather is the result of true artistic effort in so designing the proportions of the surfaces of the automobile that the finished product is pleasing to the eye, not only as a result of beautiful proportions but because the finished product so clearly sets forth the power, speed and comfort of the vehicle.

Digitized by Google

Digitized by Google

The modern street car should, therefore, be well proportioned with the simplest possible lines. Since an extremely bulky object is out of place on the street, the lines of the street car should tend to diminish and not increase its size. For this reason, the roof should be as low as possible. There is no use for vertical space in the body of the car beyond that which is adequate to take care of standing passengers. The cost of the cubic content produced by greater size than this is wasted. A low car of any dimensions is more attractive on the street, and the saving of unnecessary height produces a saving in direct proportion in the vital matter of weight. Since acceleration and retardation, the chief factors of the modern fast schedule, depend directly upon weight, unnecessary height in a car is not only unsightly but detrimental to the efficiency of the car.



Cincinnati's new cars are in keeping with the tone of the fine residential areas in which they operate

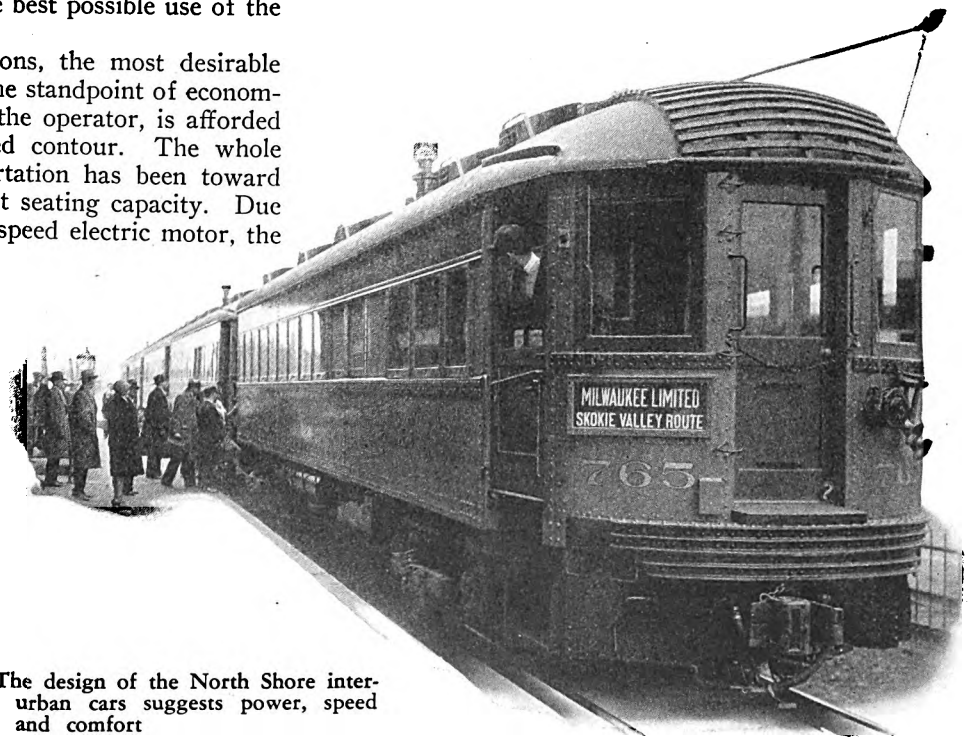
The appearance of bulk in the street car is also minimized through the adoption of single sash. Even though the single sash be as great in vertical dimension as the double sash, it does not accentuate the height of the car as much as the double sash.

Prominent roof construction also emphasizes the bulk of the street car. This construction may result from the roof being too strongly arched, from a monitor deck, from conspicuous ventilators, trolley boards or other appendages. A curved roof with very flat arch and as few added structures as possible makes the most graceful and least bulky roof with the best possible use of the space underneath.

Under modern traffic conditions, the most desirable front end of a street car, from the standpoint of economical use of space and vision of the operator, is afforded by a square and not a rounded contour. The whole tendency in urban bus transportation has been toward the use of buses with the largest seating capacity. Due to the development of the high-speed electric motor, the trolley bus with its high rates of acceleration and retardation has again loomed as an important factor in city transportation. All modern trolley buses have been designed with square ends approximating those of the large capacity urban bus. The street car with a square front end thus will harmonize in appearance with the trolley bus and the gasoline bus, permitting all the essential elements of the modern transportation utility to be harmonious in appearance.

Street cars have been placed in operation in many cities within the last year or two which have shown the appreciation by the designer of the benefit of careful proportion and construction of external elements of the car which reflect credit on the progress that is being made in this important matter.

In choosing the color scheme of the urban transportation system, consideration should again be given to the general effect created on the street. In a city of any size the units of the transportation company, be they street car, bus, or trolley bus, comprise a large part of the picture presented on the street. An essential factor of this effect is color. Color, in looking merely at the street car itself, is one thing; the color of the street cars on the street, when taken along with everything else in the view on the street, is quite another matter. I am firmly of the opinion that orange, which in the past has been a favorite street car color, does not fit in well with the general scheme of things on a city street. It is necessary, from the standpoint of safe operation and the prevention of accidents, that visibility be considered in adopting a standard color. There are a variety of tans, greens, browns, creams and similar colors that can be adopted to produce not only visibility but a pleasing and harmonious appearance. But, whatever colors may be adopted, they should be used to produce an effect of simplicity. If two colors are used, one should be placed



The design of the North Shore interurban cars suggests power, speed and comfort

Digitized by Google

below the base of the windows and the other above that line; if three colors are used, one below the base of the windows, the second from that point to the roof and the third on the roof. Complicated striping, large ornamental designs, sunbursts and dragons are entirely out of place on a transportation vehicle.

Whatever color is adopted, it must be kept up as a color. Any mercantile establishment in a modern city that looks decrepit and run-down is going to pass out of the picture. A street car or bus that has been painted a distinctive color that has been allowed to deteriorate and become old and patchy is an offense to every one in the city that sees it, whether or not it is realized. The use of modern lacquers makes it possible to restore the color of the transportation unit comparatively cheaply. In no respect can a transportation company make good its boast of furnishing a real service to better effect than by insistence upon keeping up the color of its vehicles.

The most economical floor for a street car is wood. However, there are other floor coverings that have a great deal more passenger appeal that possess no element of frill or "gingerbread" and the use of which is dictated by ordinary business instinct. The three alternatives in most general use are linoleum, rubber and flexolith, or similar mineral preparations.

Linoleum, particularly battleship linoleum in a solid color, presents a pleasing appearance but is more or less subject to wear. Rubber floors are not satisfactory on city cars because of the inability to keep them smooth and level under the conditions of city transportation. Flexolith flooring seems to have no serious defects. While it costs more to install than the ordinary wood floor, it presents a pleasing appearance, is not slippery and has splendid wearing qualities.

Any city transportation unit should be well lighted. The tendency in modern life is to be content with no middle ground in illumination. A street car should be so well lighted that passengers can easily read and so that the cars present a brilliant appearance on the street.

The lights in the car should be carefully placed to insure the best possible diffusion and the highest degree of comfort to the passengers. The latter consideration dictates that there should be two rows of lights from the front end of the car to the rear end, one over each row of seats. The modern dome fixture presents a most pleasing appearance, creates the best diffusion of light, permits lower headroom in the car and is easily cleaned.

Another modern development in street car design is the paneling-in of the air pipes to the air valve, controller and switches. It is another praiseworthy development which has no essential drawback. Of course, in inspecting such apparatus it may be necessary to remove certain panels, and in case of a collision involving the vestibule it may be necessary to replace these panels, but these are comparatively minor factors compared to the positive improvement in appearance. Simplicity should be the outstanding feature of the transportation unit and this simplicity of appearance can not be gained if a miscellaneous collection of pipes, switches and other apparatus clutters up one or both ends of the car.

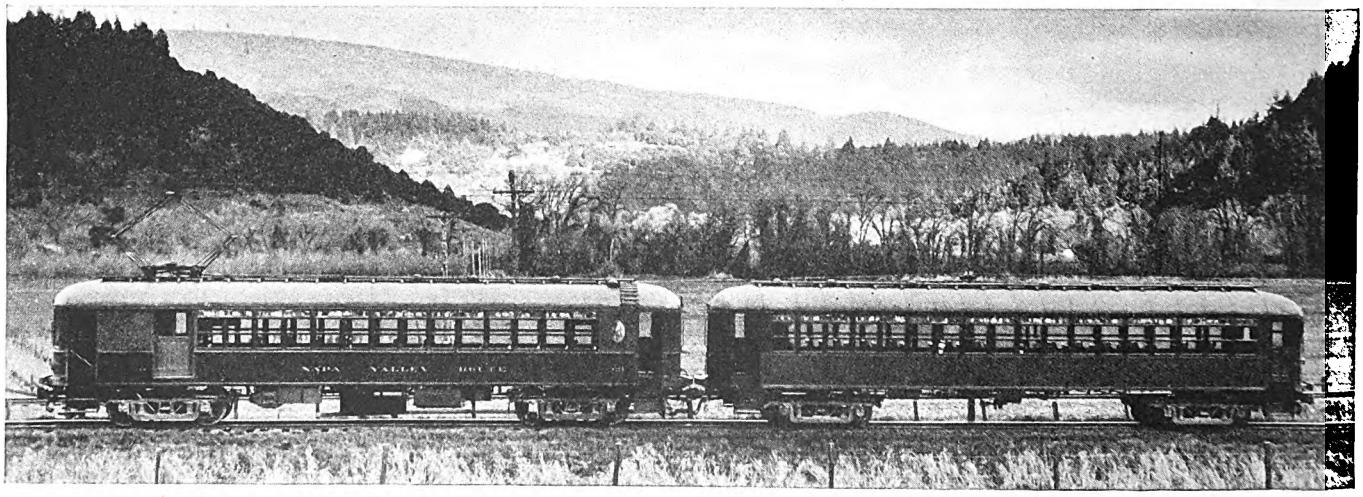
The tendency in the modern car is to insist upon having headlining. Of course, it should be as light in weight as possible and should be perfectly smooth and painted in a light color to conserve the illumination of the car.

The whole tendency in modern design is to have cross seats the full length of the car. Since a handhold is provided on the corner of every seat, there is no real necessity in the average city of hanging straps. These straps are unsightly, are associated with the cry of "strap-hanger," the relic of an older and unhappier day, and are wholly unnecessary. Stanchions should be as few as possible and should be of non-corroding material.

With large sash, composition floor, comfortable leather seats, smooth headlining, dome lights furnishing brilliant illumination, all machinery concealed, no straps and few stanchions, the interior of the modern street car is an attractive place and it has the true beauty of simplicity and efficiency. It would be less attractive if there were Turkish rugs running down the floor and costly hangings were at the windows, because it has that beauty which comes from adaptation to its purpose; nothing cheap and nothing gaudy. The exterior, too, should express the same ideal.

WELL-MAINTAINED equipment, reliable operating schedules and the general appreciation of business, reflected in our attitude toward the public, have enabled the Napa Valley to retain the maximum patronage and general public good-will, not only essential but necessary to continued operation. Although we have suffered from the competition of the private automobile we have been able to compensate some of the loss in passenger business by increased revenues from other service developed, principally mail, express, freight and motor bus.

C. E. BROWN.
Vice-President & General Manager
San Francisco, Napa & Calistoga Railway
Napa, Cal.



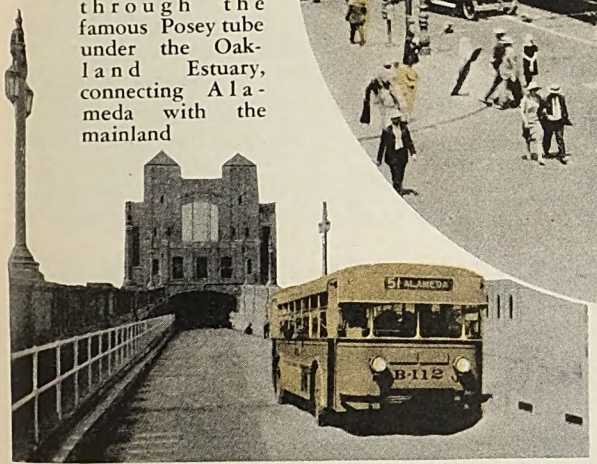
Train of the San Francisco, Napa & Calistoga Railway in a beautiful setting along the Napa Valley route

Digitized by Google

Oakland, sister city to San Francisco, as seen across Lake Merritt

Two-car train of the Key System Transit Company in the business district of Oakland

Buses are operated through the famous Posey tube under the Oakland Estuary, connecting Alameda with the mainland



Along the Key System's trans-bay line which joins the east bay cities with San Francisco

THERE is no doubt that the development of better mass transportation vehicles, both rail cars and motor coaches, is one of the most vital problems in the industry at the present time. Improvement must be made toward faster speed, greater comfort and convenience, longer life, lower maintenance, better appearance and greater appeal to the public we serve.

In spite of many handicaps the mass transportation systems continue to be the backbone of the community, the circulatory system of business and the chief factor in the making and stabilizing of property and business values. Yet the public at large does not understand our most obvious problems and their vital relations to the progress of the community. It is our own job to change this situation. Scientific and sustained effort to improve our equipment will be a very important step in this direction.

A. J. LUNDBERG.
President
Key System Transit Company
Oakland, Cal.

Digitized by Google

Latest type of car designed for speedy operation on heavy traffic routes in Brooklyn

SPEED —*an Essential of* Street Car Performance

By

W. T. ROSSELL
Vice-President and General Manager
Brooklyn & Queens Transit Corporation
Brooklyn, N. Y.

IT IS difficult for the old and impossible for the young really to comprehend the progress of urban transportation. Within the span of 30 years, the horse-drawn and the "horseless" carriages have evolved into the modern automobile, the hack into the taxicab, the carry-all into the motor coach, the wagon and the dray into the motor truck. At the turn of the century vehicular speed was ordinarily limited to 8 m.p.h. A horse, traveling at 15 m.p.h. was a runaway, causing great excitement. Into this bucolic scene of 30 years ago came the modern electric street railway car, startling in its beauty of line, its power and speed, controlled by powerful air brakes. This product of inventive genius and pioneering courage took its place as the unchallenged leader of urban street traffic.

Where are the vehicles of that day? It is as though they had never been. Innumerable models have come and gone. The streets are filled with the rush of automobiles. They seem commonplace now with their streamline bodies, their power and speed, their four-wheel brakes and easy, accurate steering. We accept as natural speeds of 30, 40, even 50 m.p.h. And yet, today, may be seen in many places the identical electric street railway car of 30 years ago moving through the streets. The car is the same, but all else is changed.

To bridge this gap is the problem. Public acceptance of the automobile clearly points the way. Limited by function, street car performance must approximate that

Digitized by Google

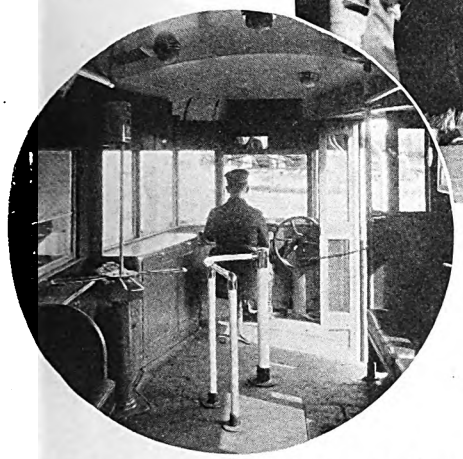
of the automobile. The street car must be made capable of holding its own in traffic. This means more speed, and the bare essentials involved in making greater speed practicable can be classified under the subjects of braking, acceleration, running speed of motors, weight, and rate of handling passengers.

There are natural differences of opinion as to the relative importance of these items. In the following discussion, where figures are given, they are not meant to be arbitrary or final, but merely indicative of opinion.

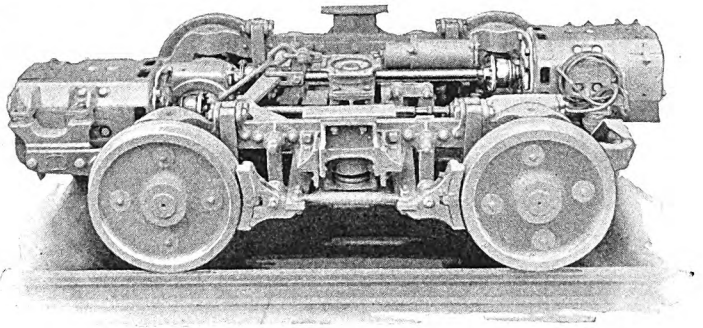
Safety is presumed to be included in the sum total.

One of the most important steps in automotive design and one which has added greatly to the average speed of traffic is the development and application of the four-wheel brakes. Many street cars have an average braking rate no greater than 1½ m.p.h.p.s. This accounts for much of the slow, hesitant op-

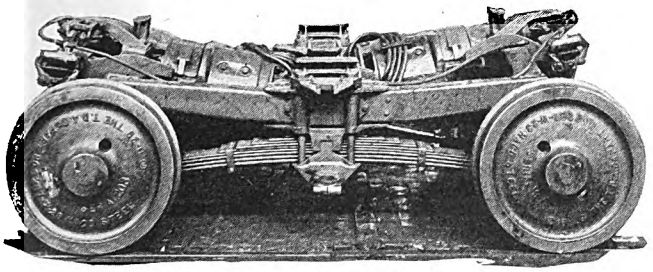
Wide doors and low steps reduce the loading time to a minimum on the Jefferson Avenue express line in Detroit



Turnstile for passengers with correct fare speeds up operation in Brooklyn

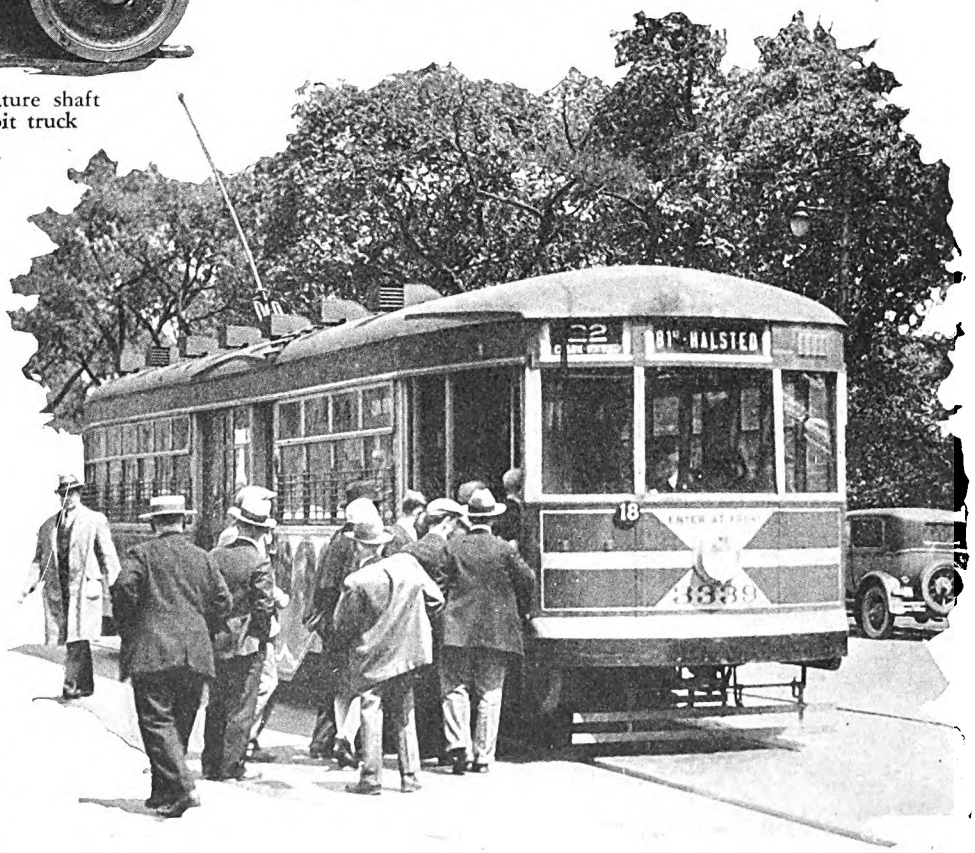


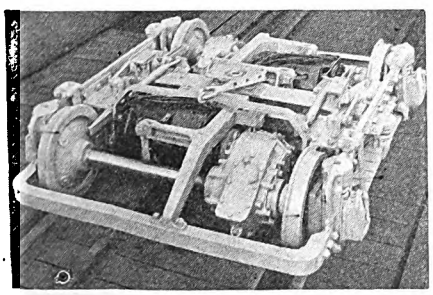
New Brill truck with motors mounted longitudinally, worm drive and wheel brakes



High-speed motors, worm drive and armature shaft brakes are features of the Timken-Detroit truck

Latest Chicago Surface Lines car equipped with four 50-hp. motors for maintaining faster schedules





Brill truck used under recent cars for Youngstown has motors mounted parallel to the axle with WN drive

Digitized by Google

eration, so common to street cars. It is not even as efficient as a one-wheel brake on a rubber-tired vehicle would be. Rates up to 5 m.p.h.p.s. on street cars are possible without a rail brake. The latter would probably be necessary for emergency use and to give the needed assurance. Rates of braking should be variable and selective at the will of the operator. Much progress has been made in this matter, but there remains opportunity for still further improvement.

The power plants now in use in automotive equipment are significant. The "get-away" is the important element in taking advantage of the "breaks." Rates of acceleration should be variable and selective at the will of the operator with a maximum up to 5 m.p.h.p.s. A rapid rate of acceleration should be continued into relatively high running speed.

It is imperative that the passengers be handled gently. Sudden changes in velocity create an accident hazard, make the ride uncomfortable, and discourage the passenger from leaving his seat before the car stops. It should be understood that it is not the high average rate of braking or acceleration that causes these evils, but the momentary sharp changes in rate. Specifically, the rate of change of braking and acceleration must be kept within limits to be determined experimentally.

All cities have large areas where vehicles are run at high speeds. Here automotive performance points the way. The same vehicle must have sufficient flexibility to operate satisfactorily in either congested or in free running areas. Whether obtained through series winding, tapped fields, variable line voltage or other means, the ideal is that the free running speed be variable and selective to suit the conditions. A maximum of about 40 m.p.h. is suitable, giving rapid operation uphill and first rate suburban service. A minimum of about 30 m.p.h. is suitable for congested areas. These figures approximate average automotive performance. They may be used as guides and compromised to the extent made necessary by limitations in electrical equipment design.

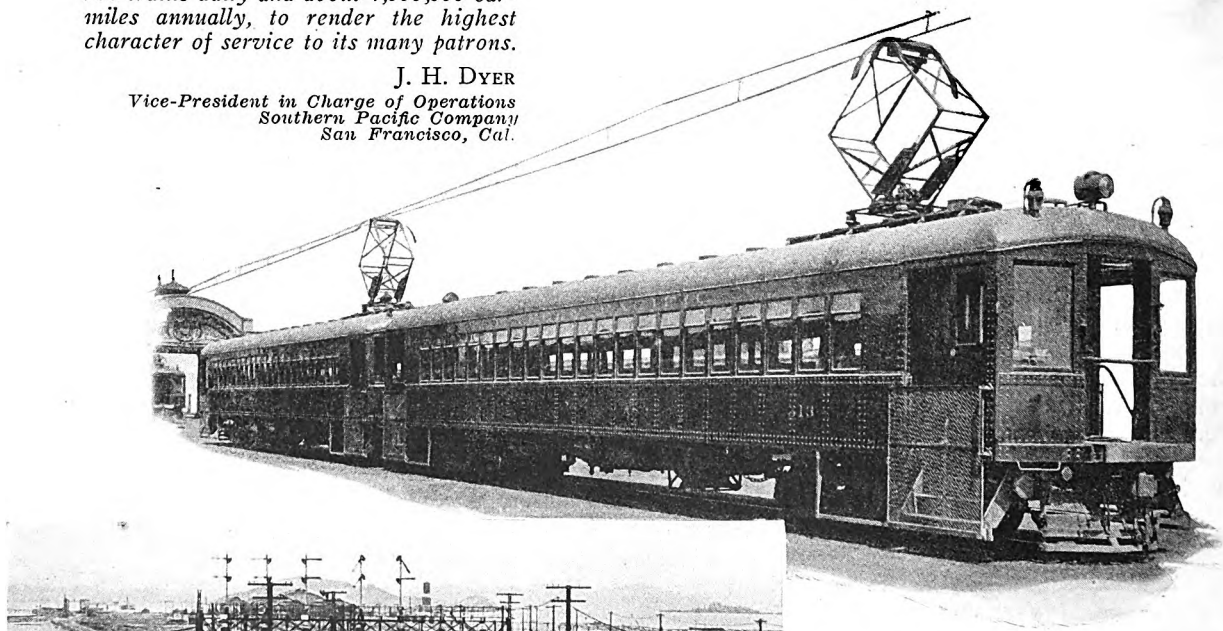
The control of weight permits higher average speed by keeping power costs within reason. Weight of a 45-ft. car should not exceed 30,000 lb., and should be brought nearer to 25,000 lb. through skillful design and careful selection of materials.

The rate of handling passengers has been given careful study and great strides have been made in improving equipment and method. Besides the training of the operator, many other things also are involved, such as steps and ramps, floor height, door and aisle widths, fare collection devices, heating arrangement, stanchions, hand holds, etc. Specialization of bodily functions of the one-man car operator is an important advantage obtained by foot control.

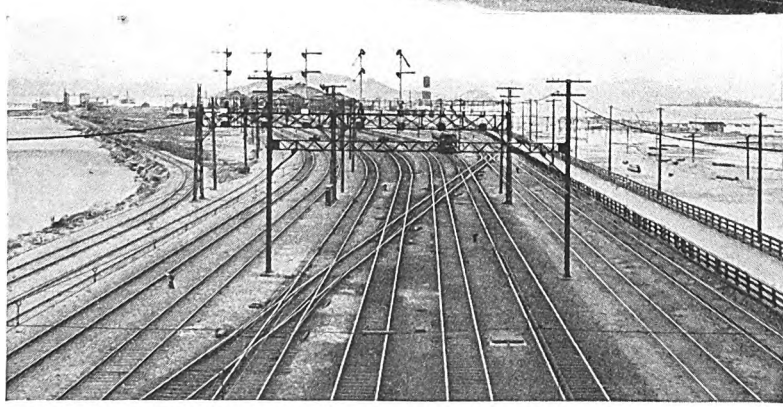
More and more, the subject of speed is claiming the attention of electric railway operators. Recent improvements in design have done much to increase operating speeds, but the goal has by no means been reached. Every fraction of a second regularly saved per stop is worthy of effort.

FREQUENT improvements in the cars to increase their attractiveness and changes in the track to increase the riding qualities have enabled the East Bay Electric Division, which operates 780 trains daily and about 4,000,000 car-miles annually, to render the highest character of service to its many patrons.

J. H. DYER
Vice-President in Charge of Operations
Southern Pacific Company
San Francisco, Cal.



Trains of this type are used by the Southern Pacific Railroad on its electrified system reaching the Bay cities of Oakland, Alameda, San Leandro, Emeryville, Berkeley and Albany



Right-of-way of the East Bay Division, leading to the train sheds and ferry slips at the Oakland pier

Digitized by Google

By

G. A. RICHARDSON
Vice-President and General Manager
Chicago Surface Lines

Second Vice-President
American Electric Railway Association

The extensive trolley bus system recently inaugurated in Chicago serves a well-developed section of the city

The Improved Trolley Bus

Makes a Bid for

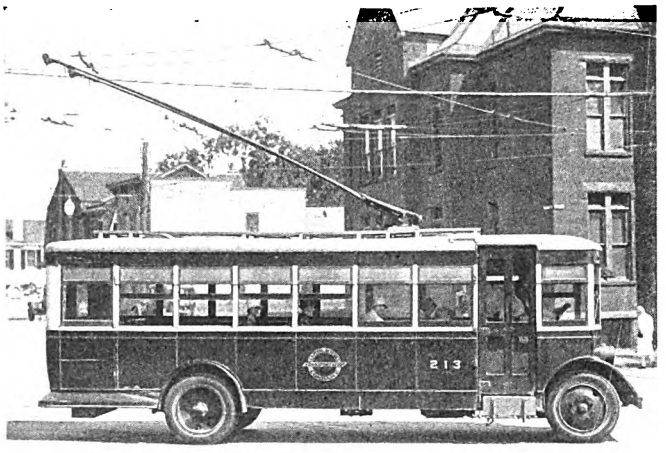
POPULARITY

RADICAL changes in the design of the trolley bus, incorporating the best features of both the street car and the gasoline bus and eliminating the faulty characteristics of the earlier vehicles, have definitely brought back this vehicle as a type of transportation worthy of consideration for many kinds of service. Although the first trackless trolley appeared in Germany in 1899 and the first one in this country in 1902, comparatively little progress was made in its development until recently. The earlier types were not satisfactory and as a result the vehicle was not adopted to any great extent. However, the adoption of the light-weight, high-speed motors developed for street railway operation, the use of pneumatic tires, the creation of excellent riding quality, and the building of a large capacity light-weight bus body, equipped for circulating loads, overcame the earlier defects and resulted in a design which has proved to be very satisfactory.

First recognition of the newer models of trolley buses came with the installation of ten vehicles in Salt Lake City in September, 1928, and of eight in Manila, P. I., about the same time. In November, 1929, New Orleans placed two in operation, and in April of this year Knoxville inaugurated a system using four. The largest system in the country was inaugurated in Chicago recently, when a total of 55 vehicles was ordered to serve more than 35.5 miles of route in the northwest part of the city. Detroit is just beginning to operate trolley buses and other cities are seriously considering the installation of this type of vehicle. It appears that it is definitely beyond the experimental stage and well advanced toward widespread adoption.

Analyses of the characteristics of this type of vehicle, its first cost and maintenance expense, its advantages and disadvantages, its performance and the public response seem to indicate that it has a very definite usefulness. Because of varying conditions in different cities and on different routes within one city no definite rule can be stated covering the use of the trolley bus, but general statements can indicate the possibilities.

Digitized by Google



The type of trolley bus developed for the Capitol District Transportation Company for its Cohoes line in 1924, represented a big advance over previous designs

Briefly summarized, its advantages with respect to the street car are its complete absence of noise and its ability to load and unload at the curb. Among its disadvantages it is to be noted that the smallness of the unit and the difficulty in getting adequate widths of aisle and lengths of platform, make it somewhat slower and more inconvenient for loading and unloading with a large interchange of passengers. Because it is a steered vehicle it operates as do all such large units, in a way that requires more clearance space on a street than a street car, and in weaving from the curb lane out toward the center of the street and back it creates more traffic interference than does a street car on fixed rails with safety zones at the loading points. The rocking of the bus due to the irregularity of the pavement, and the swinging of the unit due to the steering, cause greater inconvenience to standing passengers or those walking to or from the doors than the relatively smoother movement of the street car on good track, provided the street car is one of equally modernized design.

The trolley bus is greatly superior to the gasoline driven bus in that it has more rapid and smoother acceleration, can develop higher schedule speeds on lines with frequent stops, has complete absence of noise, and eliminates entirely the unpleasantness and danger from exhaust fumes. Because of its unlimited supply of power from the trolley wires it has opportunity for better heating, lighting and ventilating. It uses a more effective source of power at a much lower cost per car-hour. The trolley bus can be maintained by the existing shop force trained for street car maintenance, and it does not involve serious fire risk. Because the trolley bus may be treated as a street car in limiting the routes over which it may travel, it is quite likely to obtain permission in all states to build the bus at least 6 in. wider than is permitted for gas buses which are likely to operate at times even on state highways outside of cities. This additional width used for the aisle makes a tremendous improvement in convenience for the passenger. If this width can be obtained it will make an asset out of the use of fixed poles and wires.

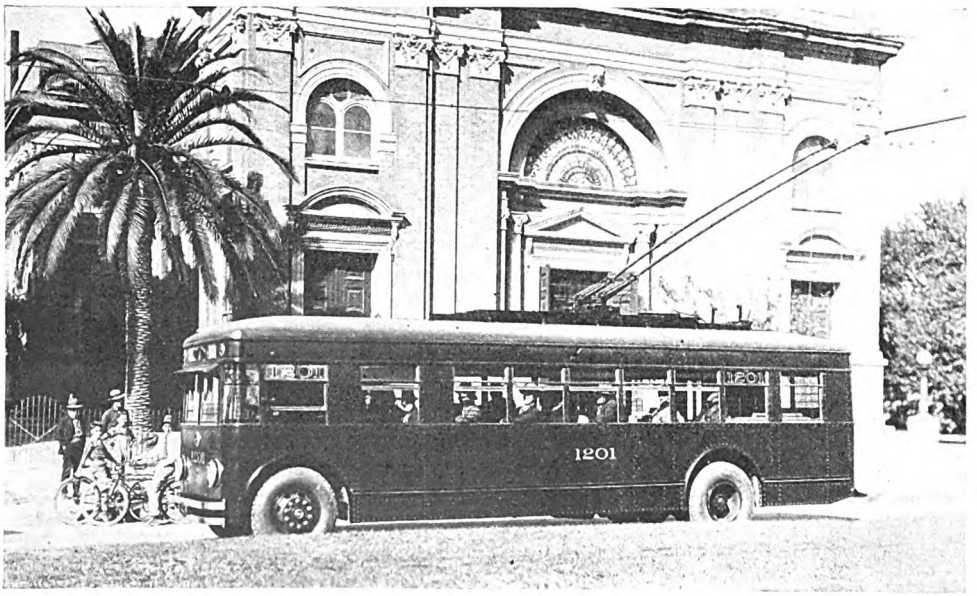
Operating Cost Low

The relative costs of operation are much in favor of the trolley bus in spite of the interest on the investment in overhead structure and the maintenance costs of that structure. It is a very slim service indeed that will not justify the additional expense in poles and wire, providing the service is likely to be continued. Naturally, if the investment in trolley structure is already made for street car service, the cost of the changes would be still more easily supported.

In analyzing these differences one arrives at the conclusion that the trolley bus is best suited for service on routes which do not yet have sufficient traffic to warrant street car operation. From an investment standpoint it is more attractive than the street car on such streets because of the lower first cost and because no permanent way is needed. From an operation standpoint the trolley bus is superior to the motor bus because of its ability to maintain a higher schedule speed with maximum comfort to the passenger and at a lower cost.

Because the trolley bus requires only the installation of overhead wires the investment is small enough to be justified when the patronage of the line is limited. With an appropriate increase in traffic, street car operation can be substituted for trolley buses by laying tracks. Thus, the trolley bus serves better than the bus in developing new areas and in serving as an extension for electric railway lines.

In some places trolley buses have been substituted for street cars on routes where the track was in need of complete reconstruction and where the travel was not sufficiently heavy to warrant this additional expenditure. Other installations will doubtless be made for the same

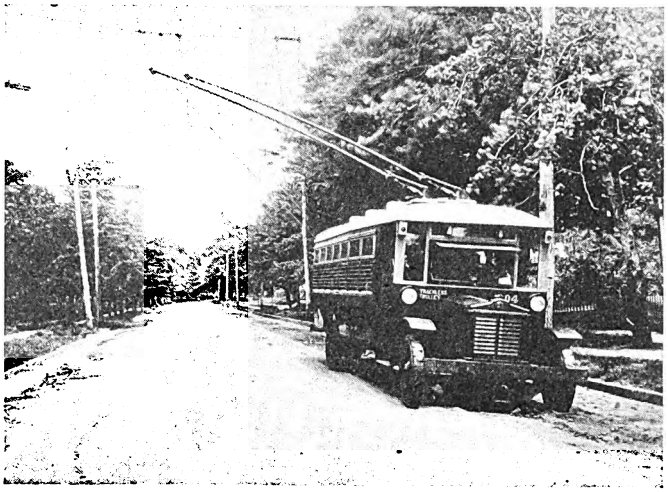


Trolley buses were substituted for street cars on an outlying shuttle line in New Orleans late in 1929

Digitized by Google

reason. On car lines where traffic has decreased to a considerable extent the substitution of trolley buses may be an economical and satisfactory move. Such a change usually substitutes the new buses for rather old street cars of a less desirable type, and is quite likely to encourage much new riding.

In middle-size and small-size cities, the trolley bus may prove the salvation of many electric railways. In general, patronage is falling off in the smaller cities, due to the competition of the private automobile. Rehabilitation of the track and rolling stock in these communities would no doubt help them in regaining lost patronage and securing new, but few of the railways are financially in a position to undertake such a program. The substitution of trolley buses would seem to be a logical step in the majority of these instances, because the vehicle would be able to give long service, would preserve a large part of the investment, would offer a service comparable to that given by the private automobile and would retain a permanent form of transportation for the community.



The old trackless trolley, with truck chassis, high body, projecting hood, heavy railway motors and hard rubber tires

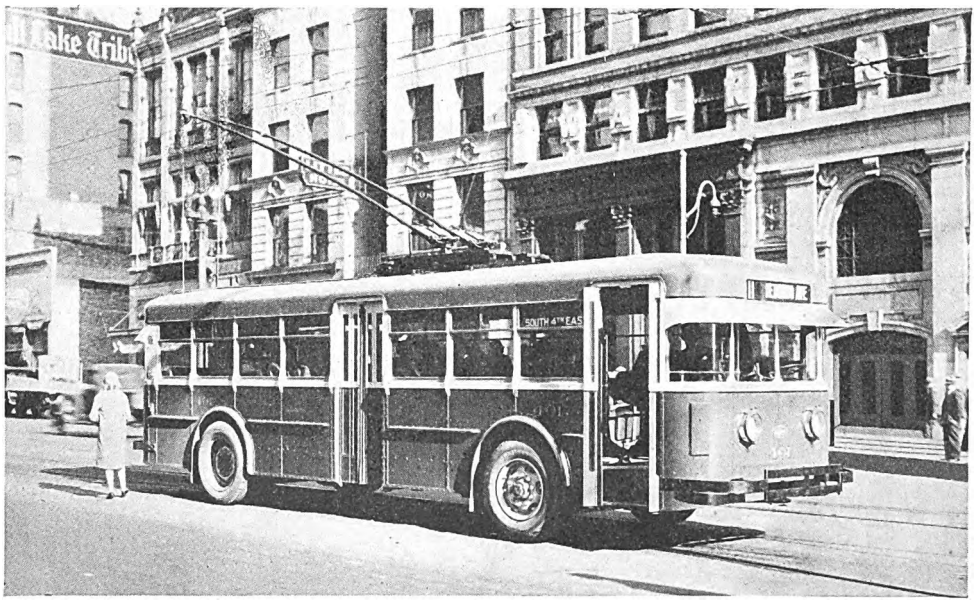
Co-ordination of Three Types of Service

Depending on the size of the city and the number of prospective patrons along any given route, the trolley bus will find varying possibilities as substitution for or co-ordination with street cars and buses. It is quite probable that, as experience with the trolley bus increases and its economic field is more clearly established, the three types of units will be found in operation in American cities all fully co-ordinated.

Although the street car has been improved materially in the past decade, it still lacks a number of the more important characteristics demanded by the automotive minded public of today. Some of these characteristics are possessed by the trolley bus. The great improvements just now being made in street car design will tremendously improve the desirability of the coming street car over anything yet in use, and will retain for the street car a position of good standing as a public carrier unit.

Fundamentally, there is a definite field of usefulness for each of the three types of vehicles. The street car, as improved in the very near future, will retain its position in first place as the right vehicle for public transportation service on heavy traffic lines, except where rapid transit is necessary. The trolley bus can well be adapted for extensions, for some residential streets of a boulevard type, for lines which are too light for the street car and for other supplementary service in co-ordination with the street car or rapid transit. The bus will no doubt continue to prove the best vehicle for extensions into very light traffic areas of uncertain future, for temporary supplements to the permanent forms of transportation, for special express type service or for service along some boulevards and in such parks where the advantage of the trolley bus in giving relief from gases and an excess of noise may be outweighted by the undesirability of having an overhead system with poles and wires.

Many factors influence the choice of type of service, and differing weight may be given to the various factors under varying conditions. Modernizing the street car is being undertaken in a very aggressive way, and its material advantage in large cities or in heavy service will remain. The value of the trolley bus will be widely recognized, and to many cities it will prove of tremendous value in restoring public confidence and interest in the public carrier as well as in providing an earning power to the operating company. It is not an equipment that can serve to replace the street car on the important routes. But it is an excellent new development of which the railway organizations should avail themselves for much supplementary service.



Electric coach lines in Salt Lake City extend from the central business district to the residential areas

Digitized by Google

Spence Airplane Photo

Los Angeles, the country's fifth largest city

At left — View of West Seventh Street in the business center of Los Angeles

The temperate climate of southern California permits the use of open-top double-deck buses the year round

Suburban line of the Los Angeles Railway, using private right-of-way

Digitized by Google

An unusual view of the Pacific Electric Railway's 3½-mile line from Echo Mountain to Mount Lowe, near Pasadena

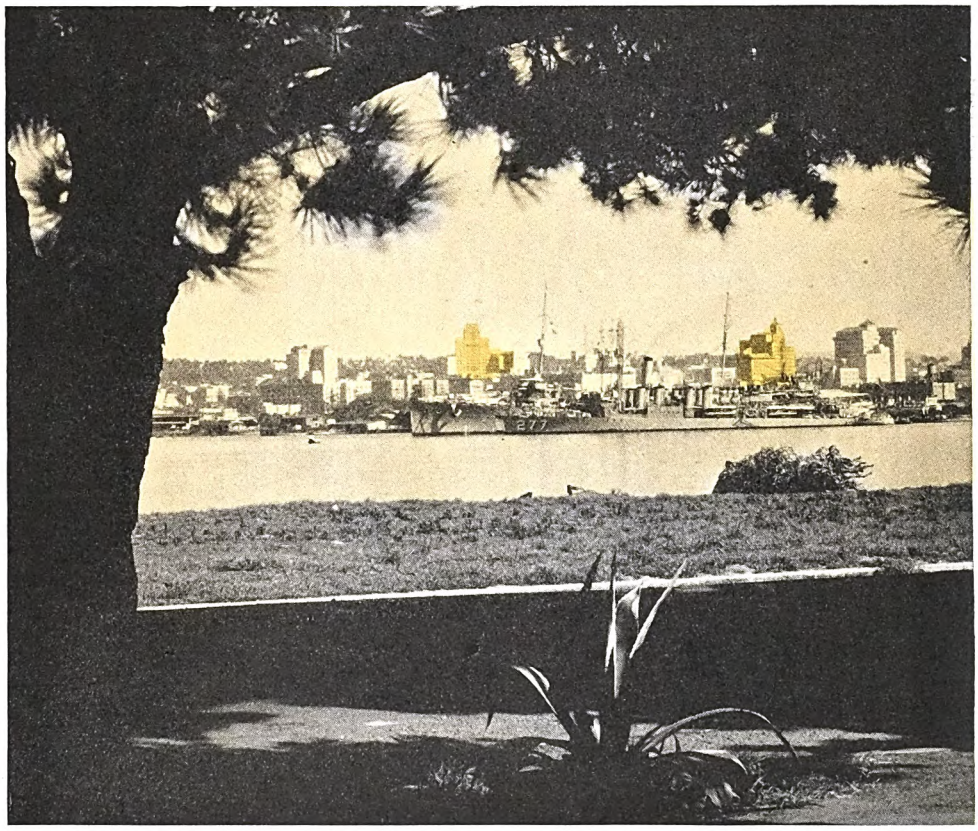
Avalon Bay, Santa Catalina Island, a beautiful resort 18 miles from Los Angeles harbor

San Gabriel Mission, one of the many points of interest in the territory served by the Pacific Electric

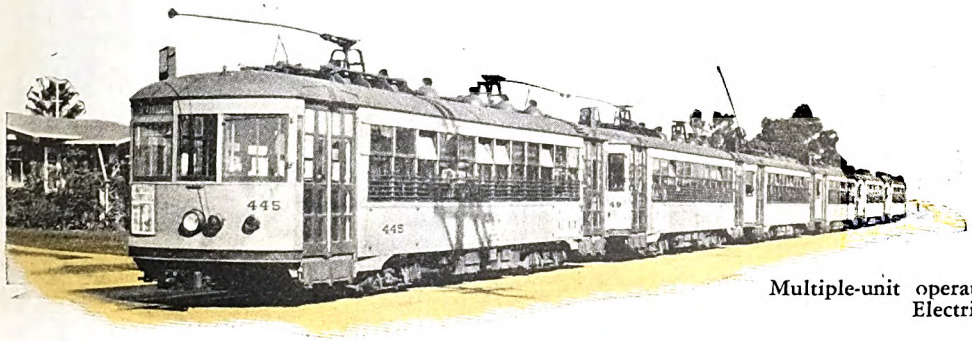
OF paramount importance to the suburban and interurban railways is the cultivation of the good will and constant patronage of the commuter. He is the regular customer—the standby we can count on throughout the year; and, to him, we owe first consideration.

He has been taken very largely into account on Pacific Electric properties in the purchase and rehabilitation of equipment. His comfort has been provided for in seating, lighting, heating and ventilation; and in car arrangement and other appurtenances, his desires have been thoroughly studied. Schedules have been rearranged to meet his needs best. Monthly passes have been adopted, for he prefers them. And in his journeyings he has been surrounded with an atmosphere of ease, comfort and quietude, and the courteous attention of skilled trainmen. D. W. PONTIUS

President
Pacific Electric Railway
Los Angeles, Cal.

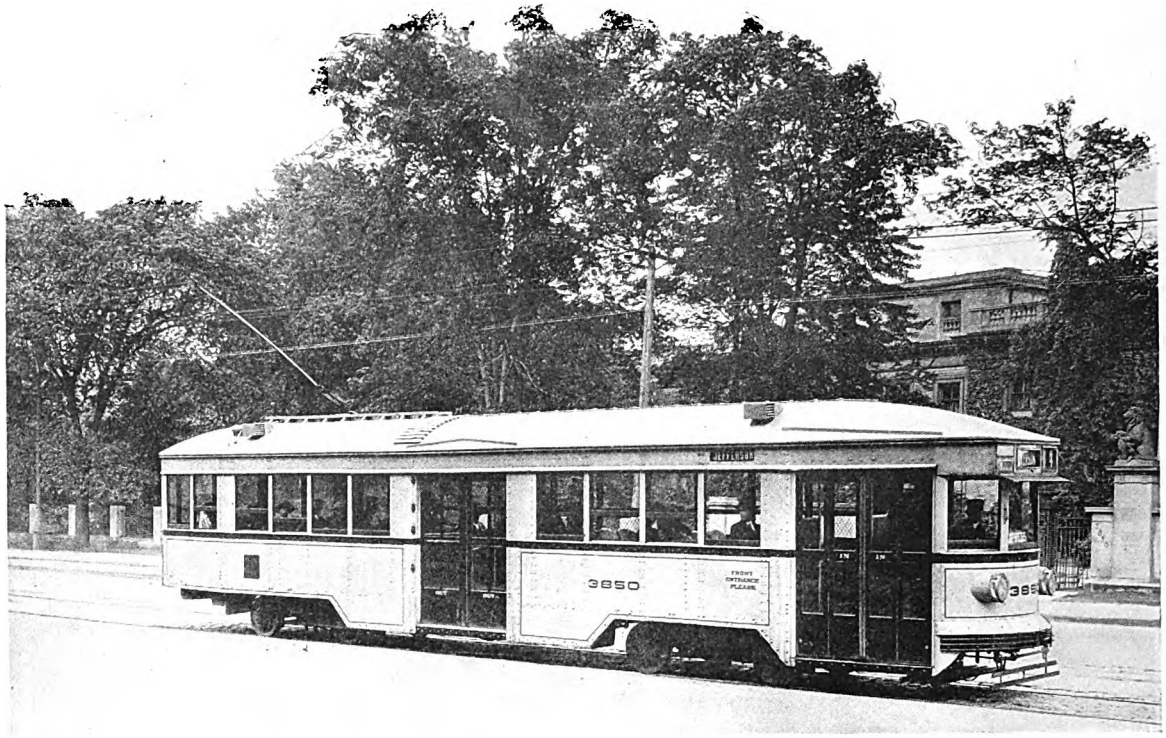


San Diego and its harbor as viewed from the near-by Coronado shore



Multiple-unit operation on the San Diego Electric Railway

Digitized by Google



This sample car in Detroit embodies practically all of the latest noise reduction features—light weight, reduced unsprung weight, insulated floor, worm gearing, insulated trolley base and special air compressor mounting

Lowering Costs and *Bettering Public Relations* by REDUCING NOISE

By

H. S. WILLIAMS

Assistant Superintendent of Equipment
Department of Street Railways
Detroit, Mich.

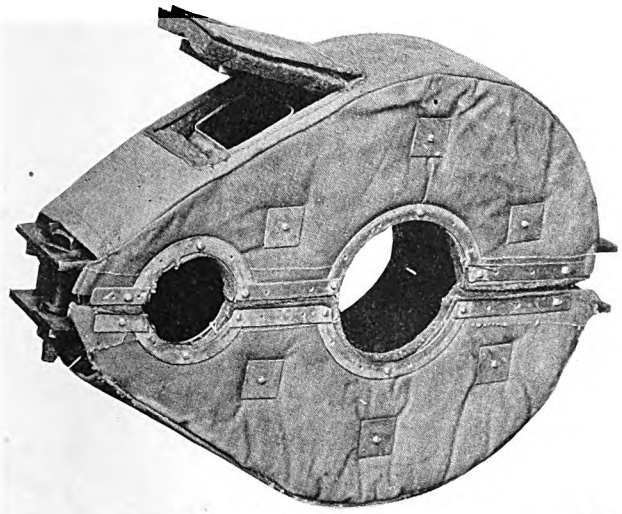
IS NOISE reduction worth while, or is it merely something which would be nice although not of sufficient importance to justify the effort needed to obtain it? We have demonstrated in actual practice that cars can be made much quieter than they are. We know that this is a vital thing and it can be proved that it is the practical thing to do.

Quite naturally one of the first considerations is the cost. With railways striving to make every dollar yield its utmost in value, this aspect of the case must be of prime importance. It is fair to assume that if it can be proved that noise reduction can be accomplished with a saving in maintenance expense it will be adopted, for economic practice is the only one which will survive.

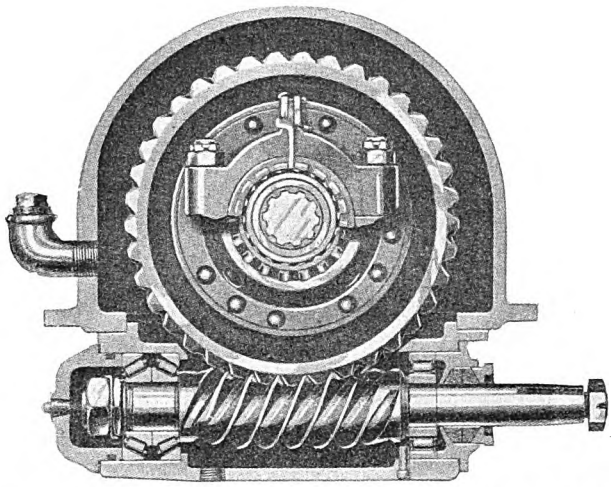
Common sources of noise in a street car are loose parts. These parts vibrate or by rebounding set up vibrations which are interpreted as noise. For example, take the motor axle bearing. When this is new its movement in the vertical plane is so nearly zero as to be negligible. When wear sets in, the movement is increased and heavy hammer blows are delivered, which mean noise. In the initial stages of service a wear of 0.001 in. means a life of approximately 5,000 miles, but when the bearing has worn so that the clearance between axle and axle bearing is $\frac{1}{16}$ in., a wear of 0.001 in. meaus a life of only 500 miles. It is at this state that it becomes a noise producer of consequence.

Let us now examine the economics of this case. The bearing is worth approximately $6 installed. It has produced, up to the time represented by the $\frac{1}{16}$-in. wear, a mileage of 69,000. If the bearing is allowed to run to double this wear, the total mileage amounts to but 77,000 or an increase of only 8,000 miles. (See ELECTRIC

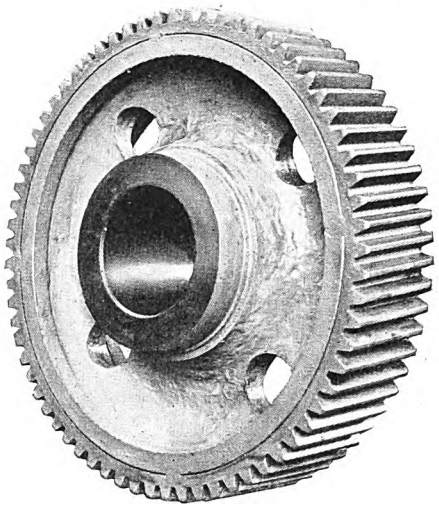
Digitized by Google



Gearcase pad of the Chillingworth Manufacturing Company for muffling the gear case which otherwise acts as a sounding board



Cross-section of Timken-Detroit Axle Company worm-gear driving unit. This type of gearing effectively eliminates noise



Quiet gear of the Westinghouse Company, using a wrought-iron band welded at several points to the gear rim

RAILWAY JOURNAL, issue of Feb. 19, 1927, p. 347.)

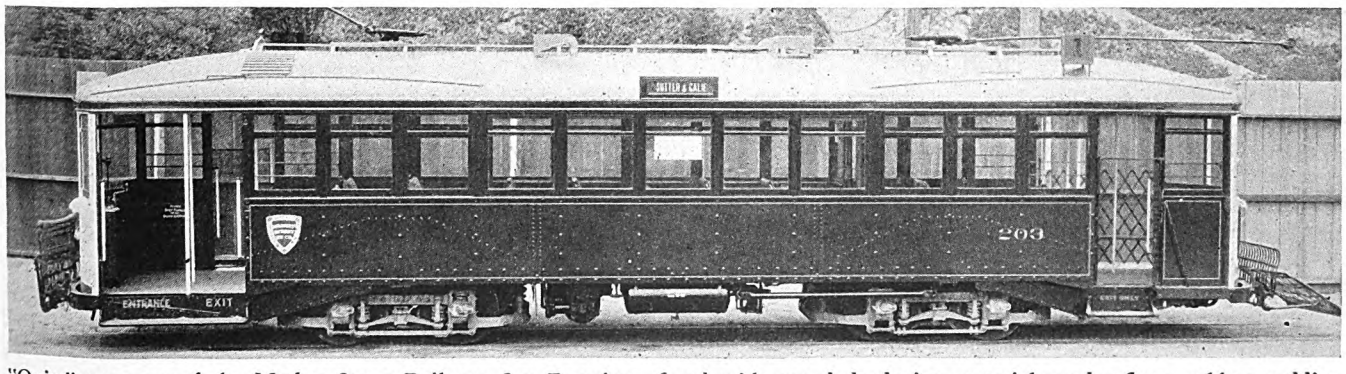
If the bearing be removed at the end of $\frac{1}{16}$-in. wear, the cost per 1,000 car-miles will be 8.7 cents, while if allowed to run to a wear of $\frac{1}{8}$-in. the cost per 1,000 car-miles will be 7.8 cents and the net saving will amount to 70 cents. To secure this saving, it is necessary to consume an excess amount of energy amounting to approximately $6.55. This figure represents the frictional loss in the bearing during the added 8,000 miles which is equal to the loss occurring during the previous 69,000 miles. Summarizing this phase of the problem, it has cost $6.55 to save 70 cents.

This only the direct saving by taking the proverbial stitch in time. In addition to this is added gear wear caused by allowing abnormal separation of gear centers. This in turn lowers the efficiency of the gears. The gear loss from a set of spur gears when new and operating under the best of conditions is approximately 2 per cent. If we allow an added loss of 0.1 per cent for the spread centers, a conservative estimate, then with an 18-ton car in ordinary city service an added energy loss of approximately 45 cents per bearing is entailed. This amount should be added to the $6.55 previously mentioned.

In addition to this is added gear wear greater than the normal wear. It is difficult to evaluate this factor, but it is present and a very definite thing nevertheless. Moreover there is the intangible nuisance of noise which has been added to the sum total of other noise of the car. In an age like the present where everyone is becoming noise-conscious there can be no question that noise suppression has a value even though it is impossible to reduce it to dollars and cents as concerns its reaction upon our patrons.

To sum up the above case, the bearing which has been allowed to run its limit of wear instead of being changed when it should have been, has given an increased mileage of 8,000, or 11.6 per cent, and represents a saving of 70 cents. But to secure this saving it has cost $7 plus added gear wear, plus the annoyance of noise. So in reality there has been an economic loss of $6.30 per bearing in addition to the intangibles mentioned. Such a thing is indefensible.

We have taken this case of delayed maintenance because we have definite data concerning it upon which to build a case and which we can prove to be true. Other

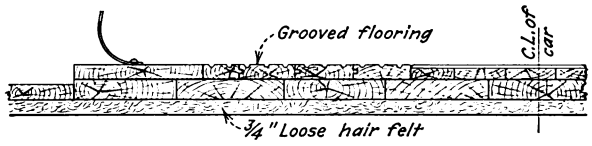


"Quiet" type car of the Market Street Railway, San Francisco, fitted with sound deadening materials under floor, rubber padding between car bolster and frame, leaded master gears, insulated gear boxes and quieted air compressors

Digitized by Google

wearing parts of the car are in the same category and wear proceeds in a similar fashion in them. Delayed maintenance and its consequent noise is much more expensive than maintenance applied at the proper time. Perhaps it might be better to say that reconditioning of parts in the early stages of wear is true maintenance, while letting wear run to the limit is nothing but repair. True maintenance is something that is orderly, scientific and economical; repair is a slipshod makeshift and very expensive.

Having shown that noise reduction means cost reduction from the maintenance standpoint, let us now look into some of the features which should be built into cars to make them inherently quieter. One of the points of greatest importance under this heading is weight reduction, especially the reduction of unsprung weight. Much thought has been devoted to this idea and a great deal has been accomplished in a developmental way. To be sure, the great objective has been reduced operating cost but the noise-reduction value of the lighter weight should



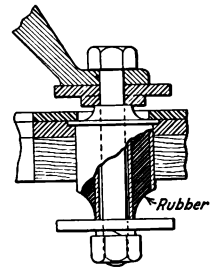
Floor design of the Detroit Department of Street Railways using a ¾-in. layer of loose hair to absorb sound

not be overlooked. To give an idea of this expressed in percentage it may be stated that if the weight of a car be decreased 10 per cent, the noise due to wheel impact will be reduced 3.64 per cent; if the weight be reduced 20 per cent the noise will be lessened by 7.72 per cent. Inasmuch as noise due to wheel and rail contact is one of the major sources of annoyance, the reduction of weight is very important.

Gearing is another important source of noise. Spur gears with large teeth which have been standard up to the present time are prolific noise generators even when new and, of course, to a greater degree after wear has set in. The remedy for this on present equipment is to muffle the gear case which acts as a sounding board. This has been done effectively by the Chillingworth Company which has perfected a padding for this purpose. The Westinghouse-Nuttall gears have the ringing deadened by means of a wrought-iron band welded at several points to the inner side of the gear rim. A lead-filled groove is used by the Tool Steel Gear & Pinion Company for damping the ringing of gears. Were it not for imperfections in the gear teeth resulting from heat treatment, there would be greatly lessened demand for means to stop gear noise. Another efficient method of elimination of gear noise is to use worm gearing, a typical example of which is shown in an accompanying illustration.

As the greatest proportion of car noise originates beneath the car floor, the comfort of passengers will be greatly helped by the use of sound absorption material under the floor. There are two methods of doing this which have been tried out in actual service and which have proved satisfactory. The plans developed by the Market Street Railway of San Francisco and the Department of Street Railways, Detroit, are shown in accompanying drawings. The latter scheme by actual measurements shows a reduction of noise as heard by the passenger of 8.9 per cent.

The side sheathing of car bodies may be effectively



Method of mounting trolley base to eliminate noise. Rubber is used in tension rather than in compression

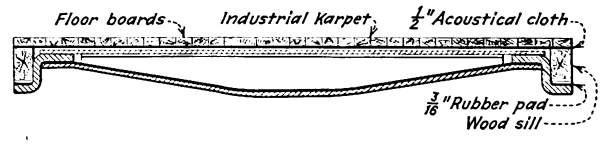
sound-proofed by a method similar to that used for flooring in Detroit, but in this case the material should be cemented to the steel panels.

Trolley-wheel noise is annoying. It may be conquered, however, by the employment of a trolley base mounting as illustrated. Tests have shown this to be so effective in city service that no sound could be heard except when the wheel passed an overhead frog or crossing. The vital point in this mounting is that the rubber is used in tension. Rubber when used as a vibration insulator is much more effective when it is in tension than when in compression. The noise of air compressors, too, may be minimized by the use of mountings similar in nature to those employed for trolley bases.

Often in fitting new pinions to worn gears, both in the case of car propulsion motors and air compressor motors, the profile of the new pinion does not properly match that of the used gear. Recently we have used a new lapping compound to run in the pinions with success.

The points previously discussed are a few of the major points having to do with the car equipment. What of the track? That, too, has a most important bearing upon car noise. Rail, in order to contribute its share to the reduction of noise, must be smooth; it must be free from corrugation and loose or cupped joints. It should have flange bearing crossovers. It must have a measure of resilience so that sound vibrations will be absorbed or damped. A soft and rough surfaced paving will be quieter than a hard smooth surface. The modern monolithic type of track construction in which concrete pavement is integral with the track ballast is a serious offender to the noise sensitive public.

Car noise is not merely a nerve irritant. It bears a



Industrial Karpet, acoustical cloth and rubber padding are used by the Market Street Railway for floor insulation

direct relation to cost in a different way than has been pointed out previously. Noise in many instances is an indication of something wrong—that reconditioning has been too long deferred. But noise is basically a vibration of parts and that in turn is an indication that metal parts are being subjected to millions of successive stresses. This in turn leads to fatigue of the metal and failure of parts. Consequently whatever may be done to reduce noise has a beneficial bearing upon the life of equipment

The subject of noise reduction is being given much study by different bodies. The electric railways and automotive concerns are interested in it to make their transportation vehicles more popular. The National Safety Council is studying it to determine its effect upon the nervous systems of workers. Civic bodies are taking up the question and demanding the suppression of noise. To summarize then, noise reduction is necessary from the eocnomical standpoint, from the humanitarian view and because of bettered public relations.

Digitized by Google

Plush-upholstered seats and a combination hot water and electric heating system, add to the comfort of passengers on the latest type of North Shore car. A thermometer and thermostat may be seen above the windows on the right

Meeting the Passengers' Demand for

GREATER COMFORT *and* CONVENIENCE

By

H. A. OTIS

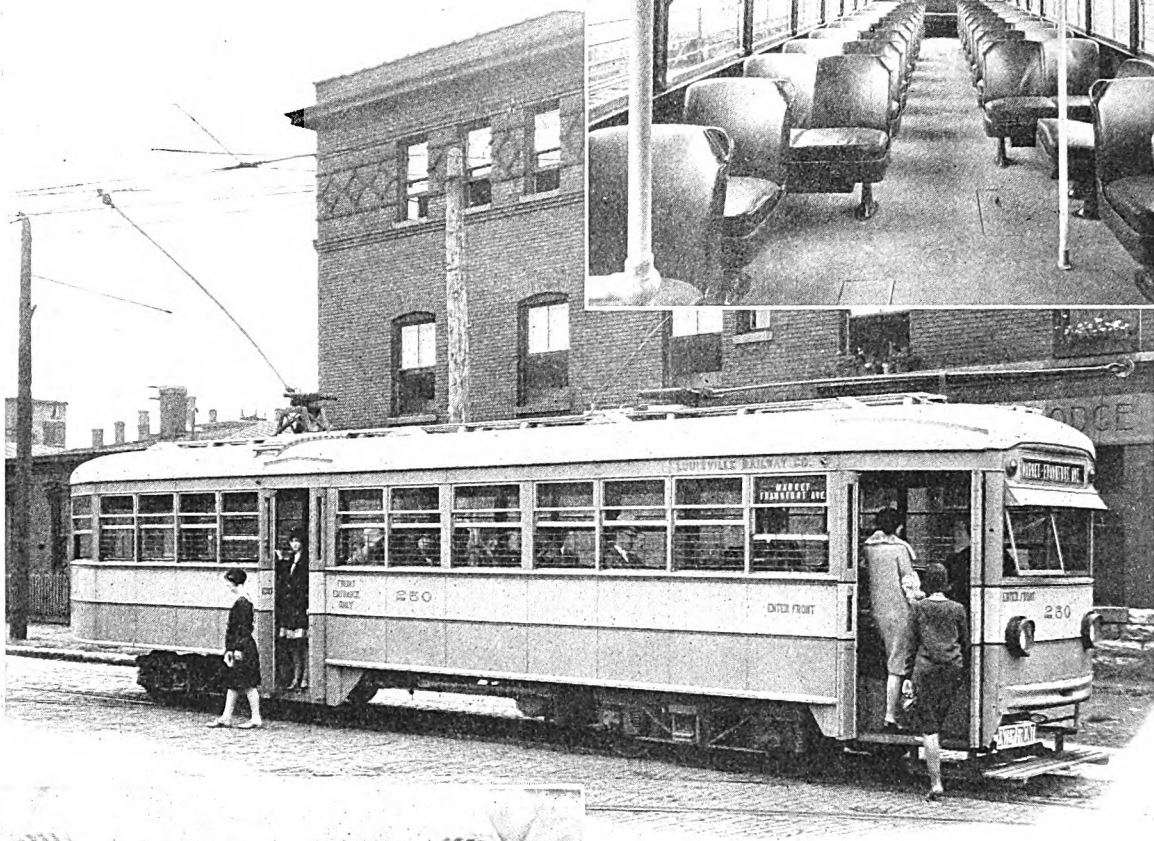
Engineer Car Equipment
Chicago Rapid Transit Company
Chicago, Ill.

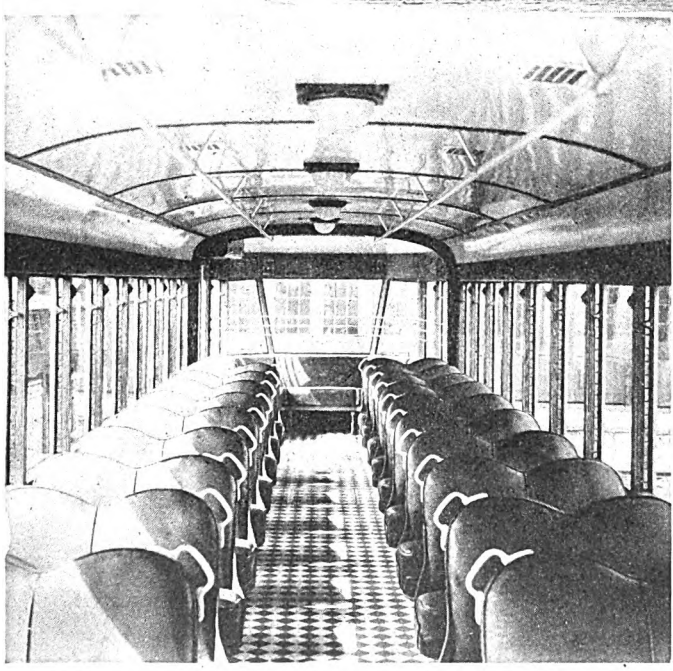
LONG STRIDES have been made in the last few years to provide greater comfort and convenience for passengers in the design, arrangement and equipment of electric railway cars. Heating, ventilation, lighting, seat design and trucks all have been improved to an encouraging extent in the general move of the industry to attract more patrons. Equipment engineers have made much progress, but are continuing to work on this big problem of the railways. They realize that many more changes in design must be effected to make the service even more attractive, comfortable and convenient to the rider, and more economical for the operator.

When the electric railway properties were first built, they filled a great need and were an indispensable part of the community in which they operated, being practically the only satisfactory means of local transportation. The city car made it possible for people to move out and live in less congested areas. The interurban, with its frequent headway and moderate speed, made it possible for people to go from town to town or farm to town in a short interval of time. In those days they performed a service far superior to any that existed and enjoyed a good patronage.

Digitized by Google

Many features to increase comfort and convenience are incorporated in the designs of the three Louisville sample cars





Top view—Two rows of dome lights, a reflecting ceiling and wide windows give ample artificial and natural light

In center—Automatic acceleration allows a high rate of starting without disturbing passengers

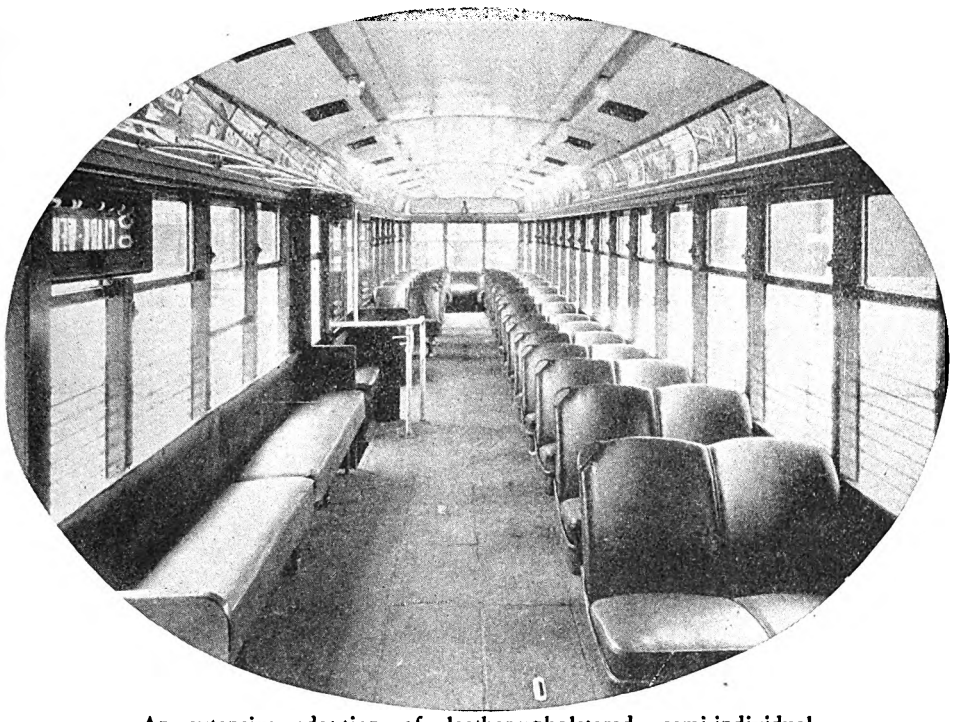
Bottom view—For the convenience of standees a wide aisle, projecting grab handles on the seats and horizontal stanchions are provided

The general introduction of the automobile, the bus and improved roads, however, brought very keen competition to the electric railway. Street and interurban cars of the old type lost their appeal to the public and many passengers adopted a newer form of transportation. The private automobile set a new and higher standard and the public rapidly showed their preference for vehicles with greater appeal. With these facts in mind the car equipment designers were faced with the problem of developing cars comparable or superior to the private vehicle. Their efforts to solve this problem have resulted in the development of many new cars, several including radical departures, and all showing a vast improvement in appearance and comfort over the older type. In the following paragraphs are listed many of the changes that have been incorporated in car design.

Heating—A new type of electric heater has been developed in which the heating element is entirely inclosed in a protecting steel sheath. This arrangement reduces the possibility of fire and electric flash which may occur when the open type element breaks with current on. A larger number of heaters have been installed on the newer type cars, many with full thermostatic control, thus giving a better distribution of the heat and a uniform regulation.

Many of the older interurban cars are heated with coal burning, hot water heaters with iron radiating

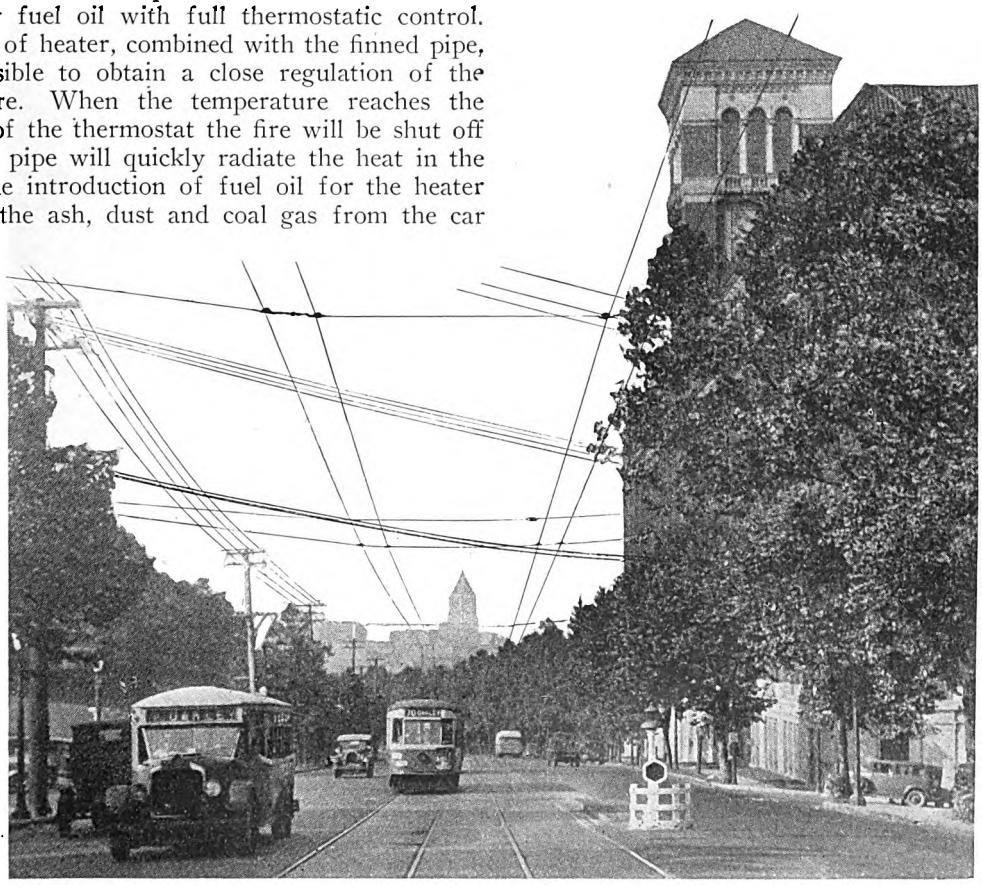
Digitized by Google



An extensive adoption of leather-upholstered, semi-individual cross seats for heavy city service was made in Chicago's 100 new cars

pipes along the sides of the car. The radiation of the heat has been greatly improved by the recent introduction of finned pipe. This finned pipe consists of ordinary iron pipe or steel tubing to which are attached vertical steel plates, thus greatly increasing the radiating surface. The biggest objection to the hot water type of heating cars has been its difficult regulation. Tests are being conducted at the present time on a hot water heater burning fuel oil with full thermostatic control. With this type of heater, combined with the finned pipe, it will be possible to obtain a close regulation of the car temperature. When the temperature reaches the upper setting of the thermostat the fire will be shut off and the finned pipe will quickly radiate the heat in the hot water. The introduction of fuel oil for the heater will eliminate the ash, dust and coal gas from the car interior and the necessity of having additional men during the winter months to tend the heaters.

Ventilation—The old deck sash type of ventilation has been replaced with automatic exhaust ventilators and in some cases with automatic intake ventilators. Tests are being conducted at the present time with forced ventilation. One system consists of a number of fans installed in ventilators in the roof; another



Many comfort and convenience features are found in the latest cars and buses of the Cincinnati Street Railway

Digitized by Google

consists of a large exhaust fan mounted under the floor, connected to registers in the floor by means of a duct. With the automatic type of ventilator the amount of air exhausted depends principally upon the speed of the car and the direction and velocity of the wind. With the forced exhaust ventilation the amount of air exhausted is entirely independent of the external atmospheric conditions.

Seats—A great improvement has been made in car seats. The older type of cars were equipped with uncomfortable longitudinal or cross seats, some made of solid wood, others upholstered with carpet or hard rattan. The new cars are equipped with the greatest number of cross seats possible, and the design of these has been changed so that they are much more comfortable. The seats in these newer cars are upholstered with plush, leather or a good grade of imitation leather. The seat spacing also has been increased to allow more room for the knees of the passengers.

Lighting—The older type of cars were equipped with bare light bulbs and no fixtures. Lamps were of insufficient candle power and so few in number that there were only one or two foot candles at the reading plane. The new type cars are equipped with light fixtures, many of the dome type, and a sufficient number of high candle power lamps to give five or six foot candles at the reading plane. Too much emphasis cannot be placed on the necessity of good illumination, as a well illuminated car greatly adds to the convenience of the passenger and to the attractiveness of the car from the outside.

Accceleration—New types of control have been developed, one of which has a larger number of resistance setps and another of which has the feature of automatic acceleration. Both of these give a much smoother acceleration. By eliminating the jerky starting which accompanied the use of older types of controllers, the discomfort to the passengers from this source has been reduced.

Trucks—The design of trucks has been materially changed in an endeavor to improve riding qualities and reliability, and to reduce weight. While the older type trucks had rigid bolsters and stiff elliptic springs, the newer type trucks are equipped with swing bolsters, very flexible elliptic springs and coil springs. Many cars are also equipped with roller journal bearings to improve the riding qualities.

State Capitol of California at Sacramento, situated in a beautifully-landscaped park. The lower view shows the business section of Sacramento, with the State Buildings and grounds at the right

Digitized by Google

Use of safety devices on the cars has contributed in a large measure to the excellent safety record made in Atlanta

SAFETY DEVICES

Aid Materially in

Reducing Accidents

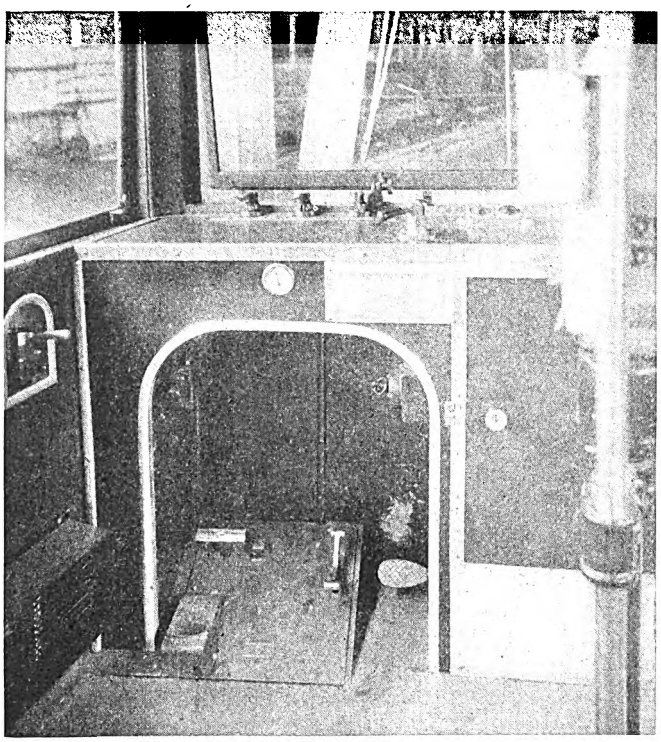
By

F. L. BUTLER
Vice-President
Georgia Power Company, Atlanta, Ga.

ANY PUBLIC utility company worthy of prospering is possessed of a conscience. It is this conscience which, if the company be a public carrier, recognizes the heavy moral responsibility of operating its cars, or vehicles, with the least possible hazard to the community it serves. This moral obligation is one reason for the increasing attention and study which has been given by electric railways in the past ten years to the reduction of accidents involving the public. An additional incentive to safe operation is the ever-increasing cost per claim to the company.

The often-used expression, "no accident is unavoidable," is probably true, but not from the standpoint of just one of the parties to it. Certainly many of the accidents involving the cars of a street railway are unavoidable as far as the company is concerned. Yet on the other hand, it must be admitted that the railways, even the best of them, have a long way to go before

Digitized by Google



Foot control and convenient, plainly-marked auxiliary control handles simplify the duties of the motorman and make operation safer

they have done all that they can and should do to eliminate the accidents which, through effort on their part, are avoidable.

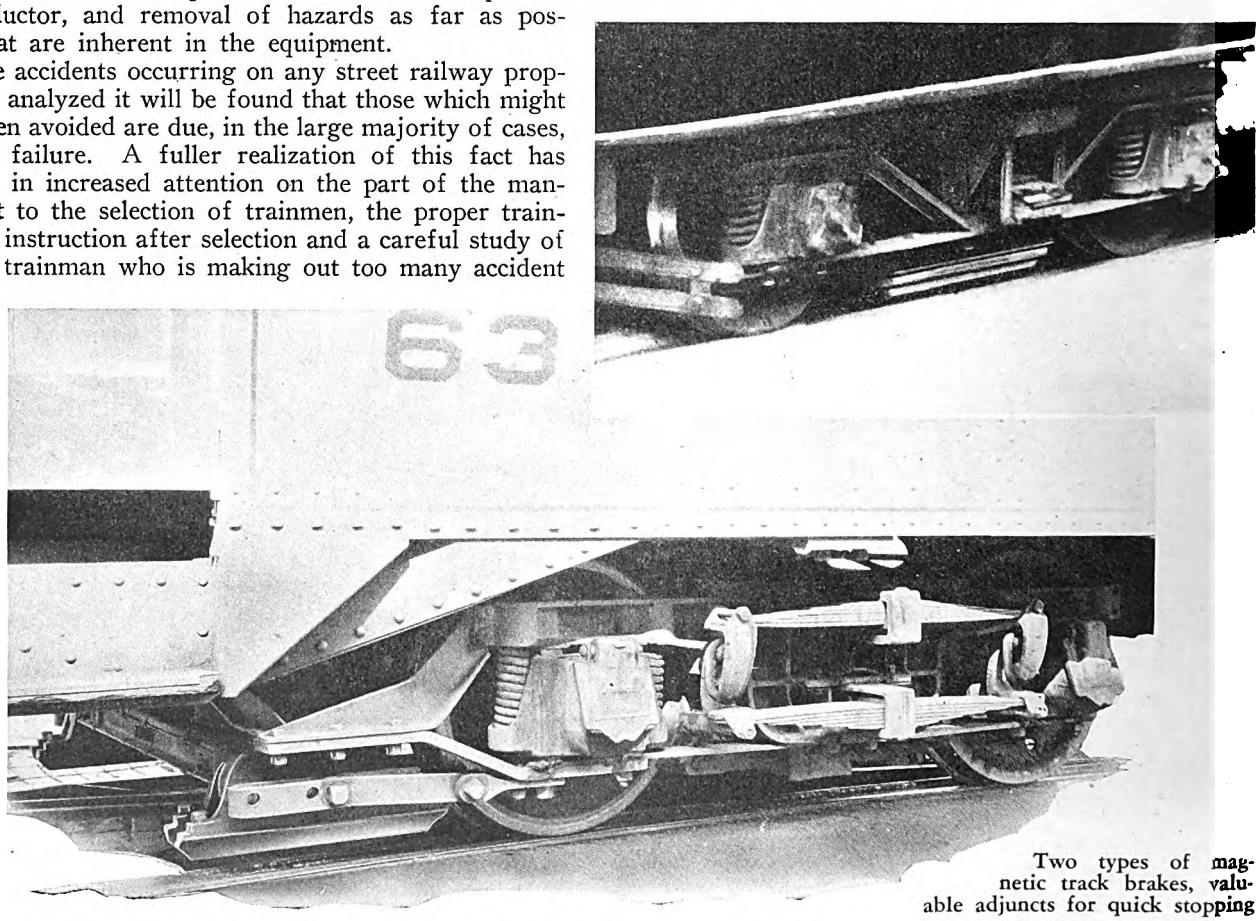
Activities pertaining to accident reduction divide naturally along two lines: reducing the number of cases of man failure on the part of the motorman, operator or conductor, and removal of hazards as far as possible that are inherent in the equipment.

If the accidents occurring on any street railway property are analyzed it will be found that those which might have been avoided are due, in the large majority of cases, to man failure. A fuller realization of this fact has resulted in increased attention on the part of the management to the selection of trainmen, the proper training and instruction after selection and a careful study of the old trainman who is making out too many accident reports. The greatest results can be obtained by upgrading the man who operates the equipment. However, much can be done to reduce those avoidable accidents which are charged to the equipment.

Taking the electric railways of this country as a group, it can be safely said that equipment is being more efficiently maintained than at any time in the history of the industry. This may be partly because of necessity, but it is in the interest of better service, as dependable service is better service. At the same time well maintained equipment is safer equipment and results in fewer accidents.

With the advent of the one-man car many new safety features and devices came into use and improved safety records have resulted. It is fundamental that divided responsibility creates a tendency to let the other fellow do the job with the result that, on cars operated by two men, accident hazards that either might avoid are overlooked by both. The one-man car puts the job directly and solely up to one man, as it should be.

To the public, ignorant of the many safety devices with which it is equipped, the one-man car does not appear as a step toward greater safety. A proper understanding of the equipment in use on the modern one-man car would clear up many misunderstandings on their part in regard to the safety of this type of car. In the industry itself there are also differences of opinion as to the value of various safety devices that have been designed and put on the market to assure the safe operation by one man of a street car through the busy streets of large cities. The question as to whether or not certain equipment should be installed on a car should not be decided from a standpoint of the first cost or maintenance cost. Executives and officials responsible for the operation of cars should realize their responsibility to the community



Two types of magnetic track brakes, valuable adjuncts for quick stopping

Digitized by Google

and see that every precaution is taken so that the operation of the cars will cause no undue hazard to pedestrians or other users of the streets.

Very often a car can be so burdened with safety apparatus that its operation not only becomes complicated but also the speed of the car is reduced. In an effort to make up lost time the operator may possibly have an accident that would not have occurred if his attention had been on the operation of his car rather than on maintaining his schedule. Simplified control is in itself a measure of safety.

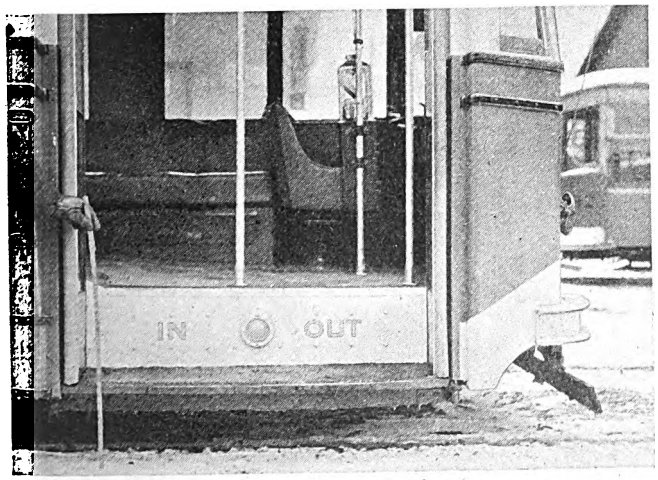
In discussing the devices and methods in use on the modern car only a short outline of their purposes and their advantages and disadvantages will be given.

"Dead Man" Controller—The "dead man" feature of the controller handle which is so arranged that the handle is depressed against a slight upward spring pressure, has been the subject of considerable discussion among operators. Having had some cases, however, when operators have fallen dead at their controller and other cases when they have fainted or otherwise lost consciousness, this feature, in the opinion of the writer, is a very important adjunct to the one-man car. Certainly its use has enabled companies to introduce successfully the one-man car. Of course, the type of accidents it is designed to prevent are rare and may possibly never occur on a small system. However, if an accident should occur from this cause, the result might be so serious as to cause legislation against the use of one-man cars.

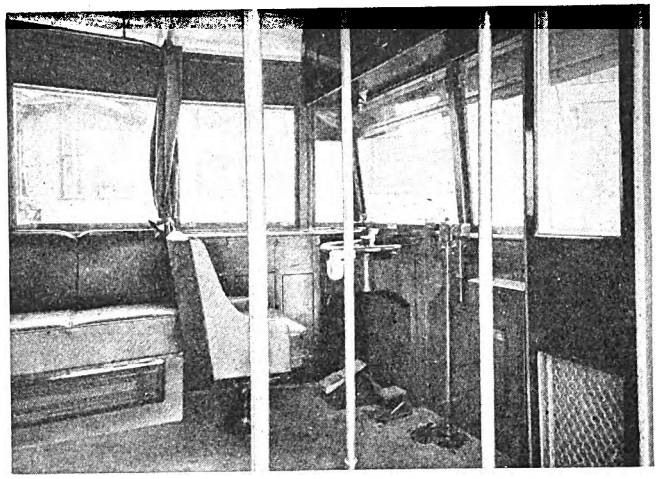
Magnetic Brakes—There is no discounting the value of the magnetic track brake, but the cost and the difficulty of application to a great many existing trucks has curtailed the use of this valuable adjunct for quick stopping. Certainly its value is increasing with the higher speeds of the modern car and the increased congestion in city streets. It has the advantage of being the only type of brake that is affected but little by rail conditions. It is not unlikely that this type of brake will receive a great deal of attention in the near future.

Dynamic Braking—The use of dynamic braking is not very extensive at present. Its use requires ample power and often, with larger motors, commutation troubles develop. As a safety factor its value is still questionable since its ability to stop the car is limited by wheel slippage.

Air Brakes—Operation of the conventional air brakes has recently been speeded up by the installation of quick-application and quick-release valves, and more recently by the coming into use of an improved "self-lapping" brake valve, which is designed so that cylinder brake pressure corresponds to brake-handle position. This valve should have a tendency to reduce lost motion in braking, due to the habit of some operators of "fanning" with the brake valve handle.



Passenger safety in boarding and alighting is increased by low step heights, step lights and properly-located stanchions



Mirrors, windshield wipers and wide vestibule windows aid the motorman in avoiding accidents

Window Guards—Window guards detract from the appearance of the outside of the car and also increase the difficulty of window cleaning. Nevertheless, it must be admitted that window guards serve to reduce the number of accidents, unless track centers are unusually wide.

Window Wipers—Certainly no one would drive an automobile these days without an automatic type of window wiper. Certain designs of window wipers for street cars are a great help during storms, and in cities where single-end cars are in use, the use of window wipers should be considered as essential. In cities with double-end equipment, however, it is difficult to keep them on the cars and to keep them in proper operating condition.

Motorman's Mirrors—Motorman's mirrors are located in two positions, one on the inside of the car and the other on the vestibule corner post outside. The purpose of the inside mirror is to enable the operator to see his passengers and also to get a vision of the rear door. To accomplish this purpose to the best advantage, the location of the inside mirror should be such that the reflected beam is over the heads of seated passengers on the right side of the car. If the mirror is located, as in general practice, so that the beam is reflected down the aisle of the car, a few standing passengers can defeat the purpose of the mirror.

The outside mirror is probably more effective in preventing step accidents, but in cities where automobile and truck drivers are not accustomed to projecting accessories it would be a difficult matter to keep them from being destroyed. Also, with loaded aisles or platforms, passengers standing on the platform between the rear end and the front end of the car would seriously interfere with the operator's seeing what is going on at the rear door.

Warning Signals—There is a need for a satisfactory electric gong which, up to this time, has not been developed. At present, the air-operated gong is probably the most used method of warning signal for city service. Eliminating the trouble from air leakage and freezing during the winter months, to which they are more or less

Digitized by Google

susceptible, they are moderately successful for city use.

Interlocking Door With Brake and Controllers—A number of cars were brought out with rear door interlocking both with the controllers and the air brakes. This combination made it impossible for the operator to start the motors or to release the brakes until the rear door came almost to the closed position. This resulted in longer stops. Some companies have removed both the interlocking features; others have removed the brake interlocking device but have retained the electric interlock between the rear door and the controller. Both features have certain advantages in accident prevention work but evidently the disadvantages have been such as to convince certain operators that their use is not essential. On our property the brake interlocking has been dispensed with. However, the interlocking between the rear door and controller is considered an important feature and is still retained.

Air Compressors—Proper pressure of air in the reservoir is one of the essentials in safe operation. The present type of air compressor has generally proved reliable, but a reduction in weight and the elimination of the commutator end bearing would be desirable.

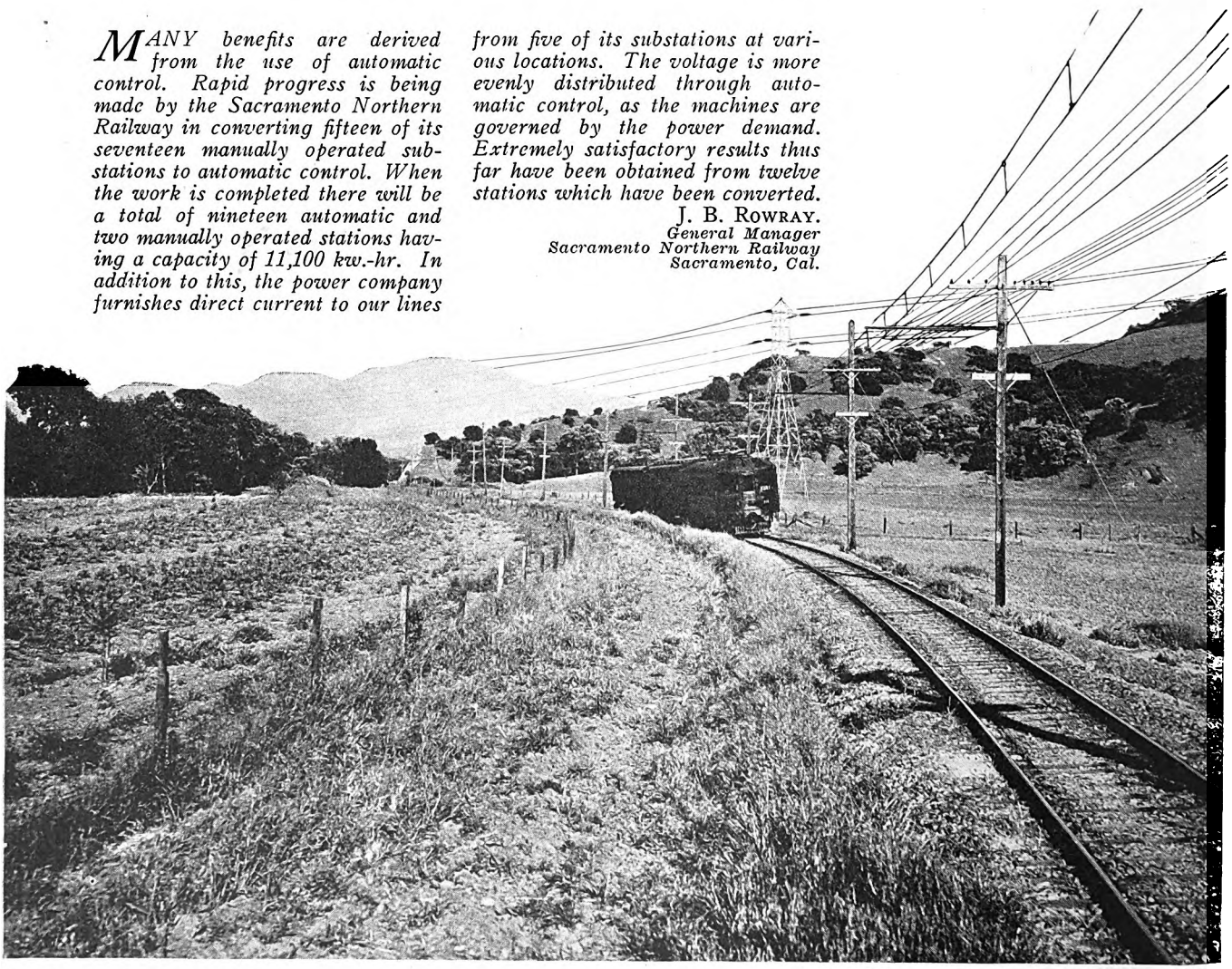
Variable Load Brakes—While variable load brakes have always had certain advantages, the introduction of the modern light-weight, high-capacity car has increased these advantages so that now we consider them a necessity.

Electro-pneumatic Door and Step Control—On one-man cars where the passengers board at the front and leave at center or rear exit doors, the electro-pneumatic door and step treadle are necessary features. The exit door should be connected with signal lamps in front. Some operators claim that signal lamps are more efficient, because the rear-door mirror distracts the motorman's attention from the front of the car and because they are not absolutely dependable. Similar criticism might be made of signal lamps as they may burn out. Their replacement, however, is simple.

The various requirements in different communities for a safe vehicle make it impracticable to lay down an arbitrary standard for which safety devices should be installed on the ideal car. All operators with the proper understanding of their responsibility to the community will equip their cars with all necessary safety features to meet the requirements on their property and will have their trainmen thoroughly instructed on the proper operation of their equipment. It should be borne in mind that the cost of a serious accident does not stop with the payment of claims, as accidents are given a great deal of newspaper publicity and discourage the use of the service so that the loss in revenue from one serious accident may go on for years. Whenever the problem is squarely met and fairly solved the return in accident prevention and in improved public relations will more than justify the cost of equipping the cars and the cost of an efficient instruction department.

MANY benefits are derived from the use of automatic control. Rapid progress is being made by the Sacramento Northern Railway in converting fifteen of its seventeen manually operated substations to automatic control. When the work is completed there will be a total of nineteen automatic and two manually operated stations having a capacity of 11,100 kw.-hr. In addition to this, the power company furnishes direct current to our lines from five of its substations at various locations. The voltage is more evenly distributed through automatic control, as the machines are governed by the power demand. Extremely satisfactory results thus far have been obtained from twelve stations which have been converted.

J. B. ROWRAY.
General Manager
Sacramento Northern Railway
Sacramento, Cal.



Speeding through a scenic valley near Mount Diablo in Contra Costa County—a three-car train of the Sacramento Northern Railway

Digitized by Google

By

CARL W. STOCKS
Editor
Bus Transportation

Developments in bus design have made this vehicle suitable for a wide variety of transportation uses

Improving the Bus to INCREASE ITS USEFULNESS

CONTINUED improvement in bus design is having a marked effect on the growth of bus use in connection with local electric railway operations. Bus designs are now available for a wide variety of traffic conditions found in city operation. Almost any seating capacity can be secured. The most popular sizes, however, are those with 21, 29, 33 or 40 seats, with some few operators still utilizing double deckers of even larger capacity.

The growing popularity of the bus is not surprising when the comparatively small investment necessary to furnish service and the ease with which credit can be obtained are considered. Nearly half the investment in an electric railway must be buried in the ground in the shape of tracks and paving, which have little or no value for any other purpose, while adequate bus operation can be furnished for approximately the same investment that would be required for the railway cars alone.

Nothing emphasizes this fact more than the rapid increase in the number of cities where rail and bus services have been closely co-ordinated. In the seven years ended Dec. 31, 1929, the number increased from 177 to 357; and in the first four months of the current year the number of cities has shown a further increase, although complete figures are not available to show the exact number.

During this period, the sphere of the bus has greatly changed. A new conception has arisen as to how buses can be economically used in connection with electric railways and as a co-ordinated part of a local transportation system. At first, buses were looked upon merely as potential feeders to existing rail lines, in order that the railway investment might be preserved without loss to security holders. But the patrons of these feeder routes failed to take kindly to the necessity of transfer from car to bus and it soon became apparent that unless through bus routes were operated into the business centers of the community, the traffic would not support the bus service. The bus service, instead of being profitable as was anticipated, incurred losses that could not be absorbed. Then followed the idea of changing the feeder bus lines to through bus routes, the gradual elimination of poorly patronized trolley lines, and the substitution of suitable capacity buses.

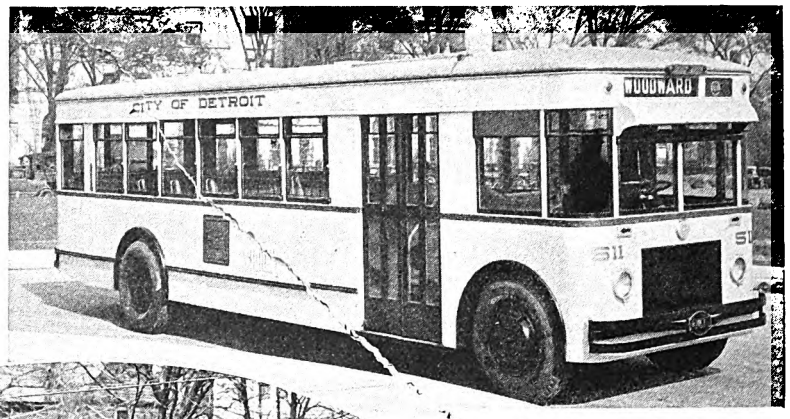
Buses are now being successfully used in a wide variety of ways for handling local traffic. The extreme flexibility of this easy riding, rubber tired transportation unit has demonstrated that it has many advantages both

Digitized by Google

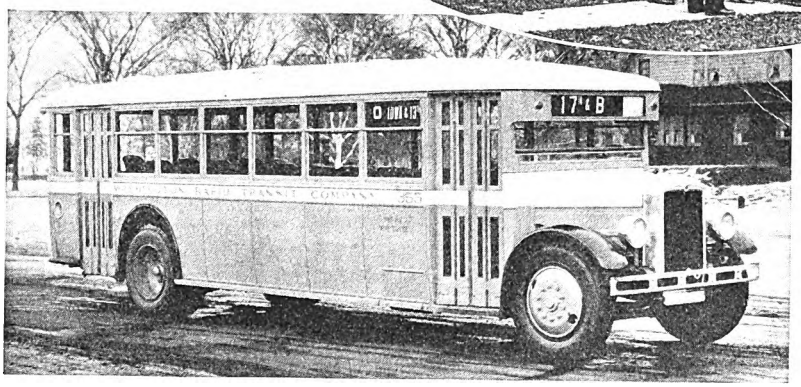
to the traveling public and to the transportation merchant. Instead of making extensions with track, buses have been used to develop new territory. Many single-track trolley routes have outgrown their usefulness and the bus is now giving better and more frequent service. Except where the volume of traffic to be handled can justify the investment for double-track railway lines, buses usually can perform with better results.

But what are the significant developments in design that have brought about this changed viewpoint toward the motor bus? From a transportation standpoint there is a bus for almost every traffic need and almost any seating capacity can be obtained. The more recent designs have adequate headroom to permit standees being carried without discomfort. For routes with extra heavy traffic or where there is considerable interchange of passengers en route, the body is fitted with a rear exit door. These doors are either manually operated by the driver or are treadle controlled and air operated. Interior illumination is better. Ventilation has been improved, although there is still opportunity for further development. The use of direct exhaust heating is gradually disappearing and in its place has come forced-draft hot air or hot water heating. Nevertheless, the obnoxious smell of burnt gases in the engine exhaust too often permeates the body interior. In cold weather it is especially noticeable with a following wind and in the warm weather it rolls in the open windows when the vehicle stops to pick up or discharge passengers. Even with the tail pipe at the rear this trouble still exists.

Nothwithstanding these defects, the bus is steadily growing more popular as a medium of transportation. It is fast; its acceleration is improving; and the time which is lost due to low acceleration is made up in smooth rapid braking, for the modern bus has a retardation with airbrakes of from 10 to 12 m.p.h.p.s. without excessive discomfort to passengers. This is far greater than is ordinarily obtained on steel rails.



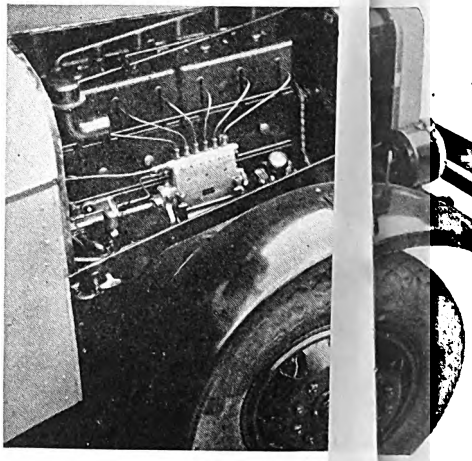
Larger capacity buses are one of the most important recent developments. For routes on which there is heavy passenger interchange, many are equipped with rear-exit doors



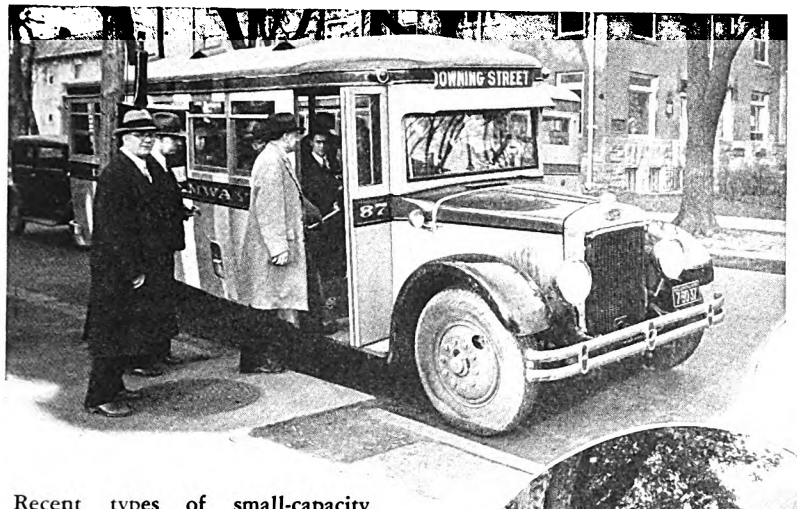
From an engineering viewpoint developments in bus design have been extremely rapid. One design has followed another with such rapidity that style and mechanical obsolescence have become factors of considerable importance for the operator. Probably no other use of the gas engine has had to meet such rigorous demands. The same can be said of the clutch and gear set. Notwithstanding this, engines have increased steadily in size and horsepower to meet the demands of the transportation service for which they are intended. In fact, engines and body shell are competing for chassis space, even though wheelbase has grown from 198 to 265 in. In the larger capacity vehicles of conventional type, the engine now protrudes into the passenger compartment. Weight distribution has thus become a factor, not only in steering facility but in tire life. Whether or not six-wheelers will again come to the front is a question that remains unsettled.

Outstanding, perhaps, is the development of the power plant. Starting with four-cylinder engines of less than 300-cu.in. displacement and rated at substantially less than 50 hp., both the displacement and horsepower have been steadily increased. Today the four-cylinder engine has been

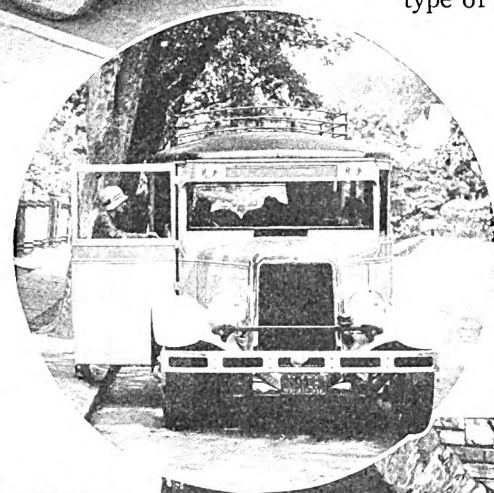
Six-cylinder Diesel bus engine used in experimental work by Public Service Co-ordinated Transport

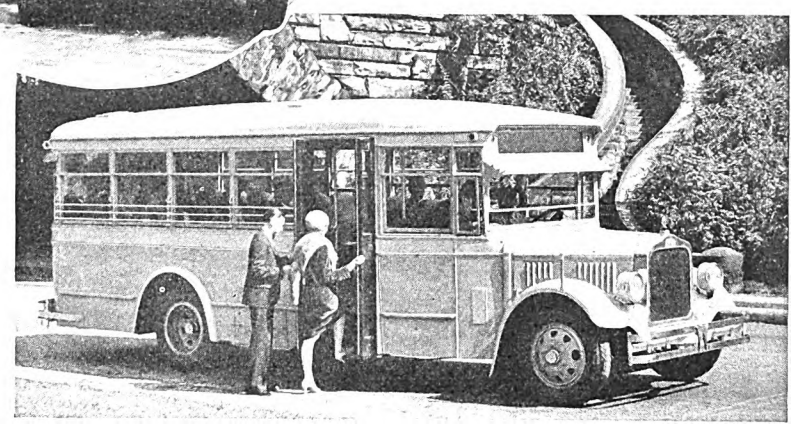


Digitized by Google



Recent types of small-capacity buses for city service

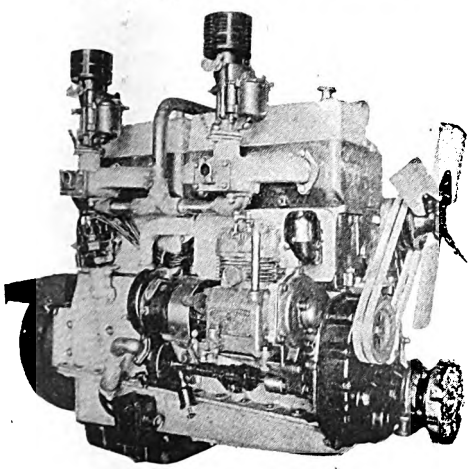




almost entirely supplanted by the six in order to meet the demand for better acceleration, faster schedules and smoother running, all of which are deemed necessary to compete with the ever increasing private automobile competition. In one instance a manufacturer has used dual engines. Engines found in the larger buses of conventional type have a displacement of from 450 to 600 and more cubic inches and a rated horsepower of 85 to 150. The rate of acceleration has likewise increased, though not in direct proportion to this greater displacement.

A word should be said with regard to the gas-electric type of drive. This unit has proved itself of value in cities where bus routes are operating in a larger measure through heavy vehicular traffic. In such places, the turn-over in passenger traffic is naturally heavy and often requires from twelve to fifteen stops per mile. Gear shifting under such conditions of operation is a severe strain on the driver and the varying rate of acceleration is annoying to passengers. It is in such service that the gas-electric unit has proved most satisfactory.

Recent designs of bus engines give greatly increased power. This is a six-cylinder 150-hp. type



Much progress has been made in the design of several of the important gas-electric bus units and the excess weight formerly found in chassis of this type has been materially reduced. Satisfaction with these units for city service is best demonstrated by the steadily increasing number of carriers using these vehicles.

Recent experiments conducted by Public Service Co-ordinated Transport, the largest single operator of gas-electric vehicles, with a six-cylinder Diesel bus engine to drive the generator should not go unmentioned. It is understood that other companies are exceedingly interested in this Diesel-electric combination and it is confidently expected that within the next year there will be several other installations in the eastern part of the country.

Next among major improvements comes that of the brakes. The manually operated type of brake has largely been superseded by some form of power brake for two reasons: first, to assure greater safety to passengers and to other highway users; and, second, to relieve the driver of considerable physical effort and resulting fatigue. Fabric linings and two-wheel brakes on the rear axle or a single brake on the propeller shaft have given way to the four-wheel type of power-operated brakes using some form of molded linings. Steel shoes were tried at one time but current practice leans heavily toward molded linings today. The use of these substitutes for fabric linings permits the use of higher braking pressures and consequently produces higher rates of retardation. These changes permit faster and safer operation in traffic lanes that are used by other vehicles fitted with four-wheel brakes and capable of stopping quickly.

So much for the chassis in general. With the continued demand for vehicles of even larger capacity and ability to carry the maximum number of standees, the manufacturers have been beset with the problem of furnishing deeper and heavier frames with more substantial cross members and body outriggers. For this reason, bodies have had to be built more substantially, thus causing unforeseen stresses to be set up between the frame and outriggers due to chassis weaving. The net result has been a battle between the chassis and the body. Instead of the frame holding up the body, the body at times holds up the frame until outriggers become distorted or broken, or the body gives way at its weakest point. It seems that there is yet much to be learned through experience as to body stresses. Whether existing designs

Digitized by Google

or methods of mounting will be discarded is difficult to say at this time, but it is evident that something needs to be done that will permit the chassis to become the load-carrying unit under any and all road conditions. One manufacturer has developed a four-point system of attaching the body to the chassis frame in an effort to eliminate transferring the body stresses, due to weave, to the frame.

Notwithstanding that over-all weights are greater on a passenger-capacity or seat basis, much progress has been made toward more effective utilization of weight-saving materials. A great deal yet remains to be done, of course, and if fuel consumption is to be reduced, one way is through greater use of light-weight alloys for strength supporting members of both chassis and body. Analysis of weights on the basis of pounds per cubic inch of engine displacement also indicates that marked progress has been made.

In refinements and redesigning of unit parts to give longer service without increased attention many advances have been made. Bus engines now reflect the last word in power and performance. The sleeve-valve engine still holds its popularity for heavy-duty city service. For use in connection with electric motor driven units, the overhead-valve type engine is being more extensively used. Noiseless and more effective tappet features have been included in the valve mechanism of this type engine by one manufacturer. Other features of the modern engine are the use of steel-backed bearings for the crankshaft or the so-called chocolate bearing, both of which are intended to produce longer life and consequent lower maintenance costs. Alloy pistons, forced feed to all wearing parts, such as pins and rod bearings, oil filters and counterflow oil circulating systems, all are playing their part in reducing engine maintenance.

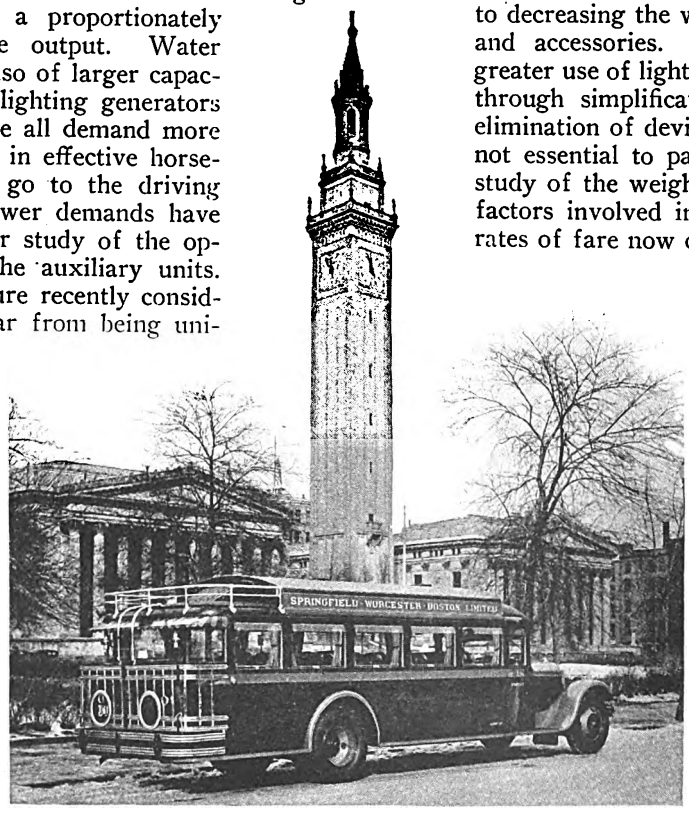
Nevertheless, as the engines have increased in size not all of the increased power has become available for direct propulsion purposes. Larger engines naturally require more power for auxiliaries. Fans are larger and their operation takes a proportionately greater amount of engine output. Water pumps and oil pumps are also of larger capacity. The same is true of lighting generators and air compressors. These all demand more power. Hence all the gain in effective horsepower can not be said to go to the driving wheels. Some of these power demands have been lowered through closer study of the operating characteristics of the auxiliary units. Oil cooling is another feature recently considered, but this practice is far from being universal in the design of all types of engines.

As has been noted, real progress has been accomplished in engine design. Speeds have been decreased for the maximum torque with the result that the lineal piston speeds have been held within reasonable lubricating bounds. Compression ratios have also been stepped up to permit the use of low grade fuels without too much loss in power.

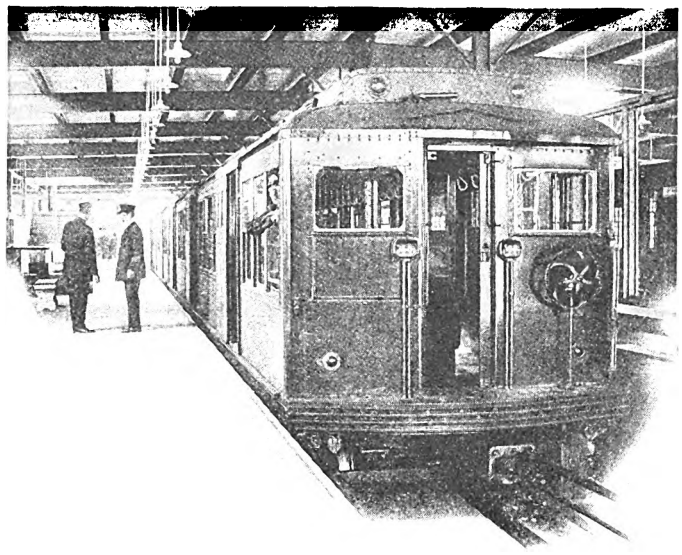
Tire developments can not be overlooked. The progress made by the tire manufacturers in selling service by the mile has produced one bright spot in the expense accounts. Tire construction has been materially improved through the use of a greater number of plies and the mileage secured from these tires is far more than at any time heretofore. The development of the heavy-duty balloon type to meet the increased weights of buses and their greater passenger capacities has increased the comfort of bus riding. What was once considered a rough road has thus been smoothed out if proper air pressures are maintained in the tires. High-pressure tires are now almost unknown, except on the older types of buses, and tire costs under the mileage contract system have materially decreased within the past few years. The rate of 1.5 cents has decreased to 1 cent or less, even with service, a figure that is difficult to meet where tires are purchased outright and maintained by the carrier.

Success in bus operation is not accidental. It can be secured only by selection of the proper type and capacity vehicle, backed up by an adequate inspection and maintenance plan to give dependable and reliable schedules. Because no two systems are alike, because road conditions between different systems are not uniform, because traffic conditions vary, and because driver training is different on each property, there can never be a standard inspection and maintenance plan. True, the methods followed can be similar but the period between inspections and their thoroughness, whether based on vehicle-miles operated, on engine revolutions, on kilowatt-hours generated, or gasoline consumption, or any other unit, must be worked out independently for each separate operating system. Every property must of necessity experiment with inspection periods of varying duration until the one best suited for the property in particular is developed.

What the future will develop in the way of further requirements in design is difficult to foresee. It is evident, however, that closer attention has soon to be paid to decreasing the weights of chassis, body shell and accessories. One way can be through greater use of lightweight alloy metals; another through simplification of accessories and the elimination of devices and attachments that are not essential to passenger convenience. Close study of the weight problem is but one of the factors involved in profitable operation at the rates of fare now current in most cities. With operating costs varying directly with the number of vehicles required for peak load conditions, it is essential that proper selection of the vehicle be made and that rush hour vehicles be of larger capacity. In order that this may be done effectively, a careful analysis of route and vehicle costs must be made periodically. With operations properly conducted there is no reason to doubt the important part that bus operation will play in the future of local transportation.



Digitized by Google



The latest type cars of the Boston-Cambridge subway accelerate and decelerate at approximately 1.75 m.p.h.p.s. and have a free-running speed of 40 m.p.h.

Answering a GROWING NEED *for* Adequate Rapid Transit

By

EDWARD DANA

General Manager

Boston Elevated Railway, Boston, Mass.

AMID all of the confusion regarding the future methods of handling mass transportation in cities there is one conviction that stands out prominently. It is that the backbone of the transportation system in very large cities is bound to be rapid transit. The very conditions which are making surface transportation more and more difficult are correspondingly making rapid transit more and more necessary.

In testimony given last summer before the ways and means committee of the Massachusetts Legislature, I summed up the situation regarding rapid transit somewhat as follows:

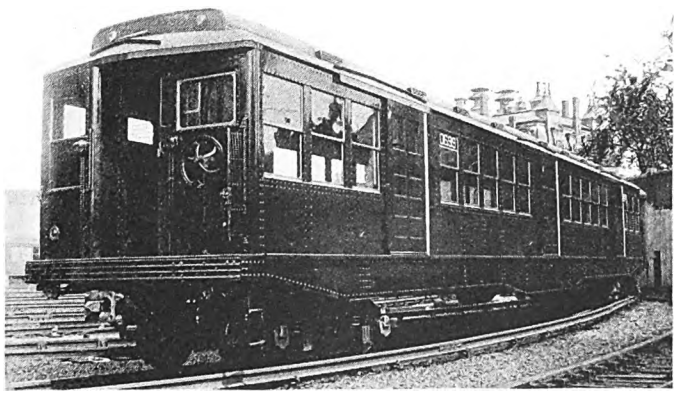
"The need for adequate rapid transit has been accentuated in recent years by the increase in private motor-vehicle transportation. This type of transportation is most extravagant in the use of street space and has led to a condition of delay and waste time. Individual transportation by automobile will probably increase, but it should go hand in hand with adequate mass transportation facilities if the city is to prosper. The situation is illustrated by the following table, showing the relative capacities for delivering passengers for a maximum one hour in one direction:

Automobiles can transport (100-ft. streets, three lanes)	4,100
Buses can carry (maximum performance record on Fifth Avenue, New York)	7,300
Street cars	13,500
Two-track rapid transit	60,000
Express and local-track rapid transit	115,000"

In a few cities in the United States there are now sections where surface transportation is already out of the question. If skyscrapers continue in favor and automobiles are allowed freedom of the streets, in every very large city there will have to be rapid transit in the congested sections. This will extend as far out as economically possible, connecting with surface car lines and bus routes at the edge of the rapid transit district.

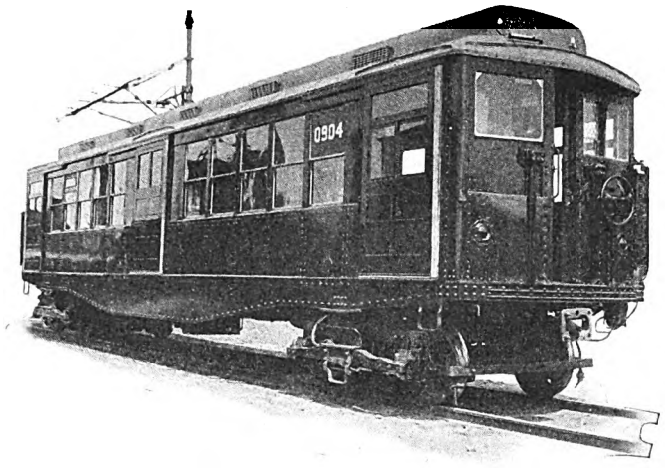
It is to be expected, of course, that there may be a reaction against excessive centralization of business. But this will not reduce the demand for rapid transit, because the new centers which must necessarily be developed will need rapid transportation connections.

Rapid transit is one phase of the solution of



The doors on the new Cambridge cars are mounted on the outside rather than inside, and are electrically operated. The vertical white bands are the rubber door cushions

Digitized by Google



Type of steel elevated car which has replaced a large number of wooden cars in Boston. It is equipped with one motor truck and has a running speed of 36 m.p.h.

the mass transportation problem about which it is impossible to generalize very much. Only the fundamental principles are applicable in all communities where rapid transit is feasible. Every large city has its individual characteristics which affect its rapid transit requirements and possibilities. In metropolitan Boston, for example, where the streets are narrow, crooked and hilly in the downtown section, the topography of the main business district is such that the effects of street congestion were early felt. Traffic flows, as it has for 300 years, from all directions into and out of the small peninsula which is historic and commercial Boston. Two-thirds of all the people entering this section use the "L." As I have stated before, Elevated transportation is the very life-blood upon which the industries and retail business of Boston depend.

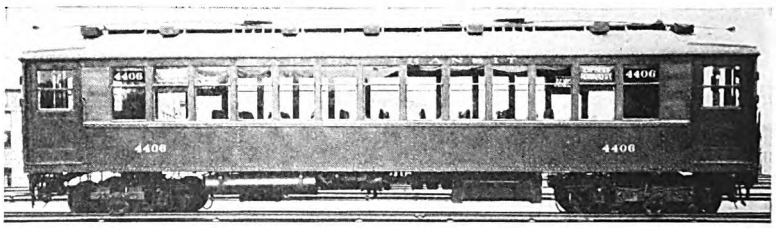
Rapid transit in general, as illustrated in Boston, is undertaken primarily to save time for patrons. It is safe to say that the saving over even favorable surface line transportation is 50 per cent. Time saving in rapid transit results from obvious advantages, principally freedom from traffic interference, reasonably economical spacing of stops, and ability to use the types of rolling stock best adapted for speed.

On the rapid transit lines of the Boston Elevated System the demand for speed is met to this extent: over the 8.5 miles of main-line elevated route the running time is 30 minutes; the 4.1 miles route between Dudley Street and North Station (via Atlantic Avenue) is covered in 15 minutes; between Harvard Square and Ashmont (9 miles) the time is 25 minutes. The rush-hour headway on the main-line elevated and between Cambridge and Ashmont is two minutes, with a normal-hour headway of four minutes on the former line and 2½ minutes on the latter.

How the Running Time Is Kept Down

Speed of operation, aside from duration of stops, depends on running speed, rate of acceleration and rate of braking. Efforts of engineers are constantly being directed to increasing these quantities without exceeding cost limitations (first cost and maintenance) and without making riding uncomfortable for passengers.

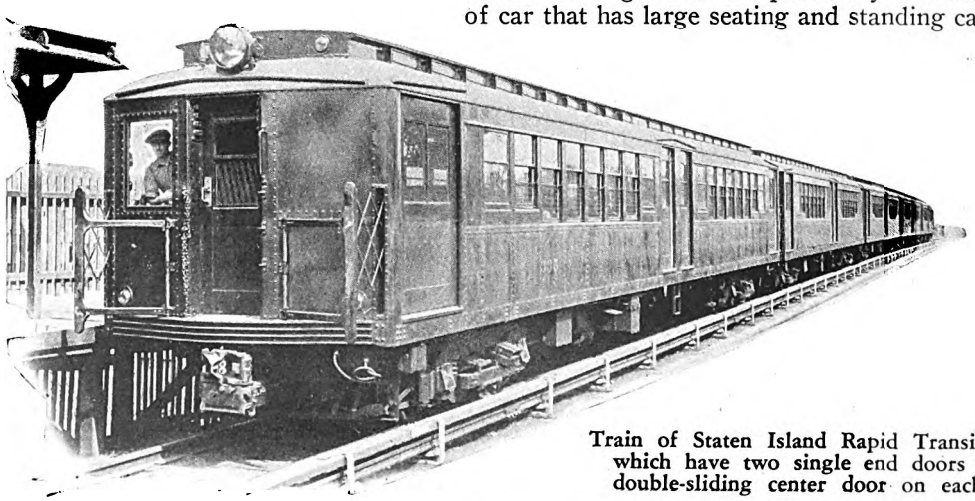
In Boston we are using an accelerating rate of 1.75 m.p.h.p.s. in the Cambridge subway and East Boston tunnel with unloaded cars, and 1.5 with cars carrying seated load. The braking rate is 1.75 m.p.h.p.s. The elevated cars accelerate at 1.5 m.p.h.p.s., light, and at 1.3 m.p.h.p.s. with seated load. The braking rate is from 1.5 to 1.75 m.p.h.p.s. The free-running speed is 36 m.p.h. in the Cambridge subway and 40 m.p.h. on the same route in the open. The speed in the East Boston tunnel is 30.5 m.p.h. and that on the elevated is 36 m.p.h. These rates have proved adequate, but research is constantly in progress looking to possible improvement. We feel that quick pick-up and stopping are just as good sales points for mass transportation as they are for the automobile.



Recent type of Chicago Rapid Transit elevated car, using cross seats, an unusual practice for heavy service

The Rapid Transit Car Is the Crux of the Problem

While rapid transit has many other valuable features, an outstanding one is the possibility of designing a type of car that has large seating and standing capacity, high-

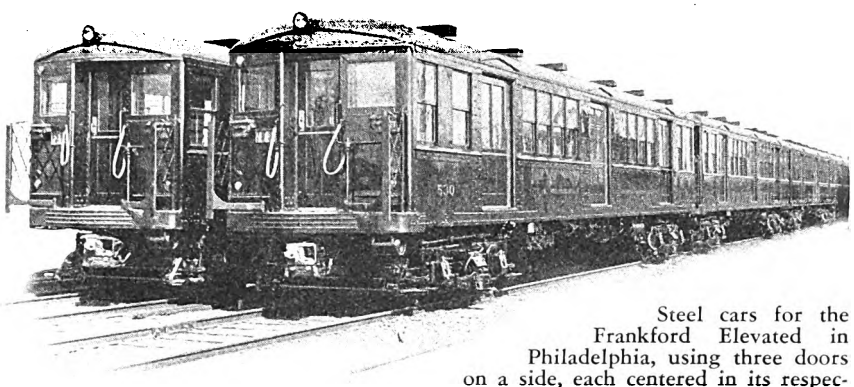


Train of Staten Island Rapid Transit cars which have two single end doors and a double-sliding center door on each side

Digitized by Google

speed characteristics, quick pick-up and braking, etc. It will be of interest to consider some of the elements of modern rapid transit car design.

Of course, cars should be designed to present as pleasing an appearance as possible, although this feature may be complicated by some limiting condition in connection with window openings, letter boards or other governing considerations. During the past few years, street cars have been greatly improved in appearance. With rapid transit cars, however, there is not the same opportunity to vary the design aside, possibly, from the arrangement of doors, windows and roofs. Limiting conditions of tunnels usually definitely fix the car dimensions.



Steel cars for the Frankford Elevated in Philadelphia, using three doors on a side, each centered in its respective third of the car

The most practical arrangement of rapid transit car doors is one wherein the distance a passenger must walk, lengthwise of the car from the door opening to a point midway between the doors is the shortest possible and is equal throughout the length of car. This is accomplished by providing three doors in the side of the car. one at the center and two at points two-thirds the distance from the transverse center to the end of the car. With this arrangement a more uniformly distributed standing-passenger load is obtained. This, in turn, means a larger capacity than will result if the doors are arranged one at the center and one at each end of the car.

In the latter case the load is localized about the doors, with considerable available space in the area midway between them. This is true particularly in cars having longitudinal seats with a large standing area the full length of the car. Where a combination of cross and longitudinal seats is used, the condition is, perhaps, somewhat different. But even in this case, if the longitudinal seats are placed adjacent to the doors and the doors are located as in the first instance, the maximum standing load is obtained.

From the standpoint of handling the greatest number of passengers per unit, the longitudinal seating arrangement is superior to others. In the time required for loading and unloading of passengers, there also is a decided advantage in longitudinal seats in combination with the first door arrangement mentioned. The distance which it is necessary to travel to reach the door is shorter and there is freer movement of passengers due to the wide space between seats.

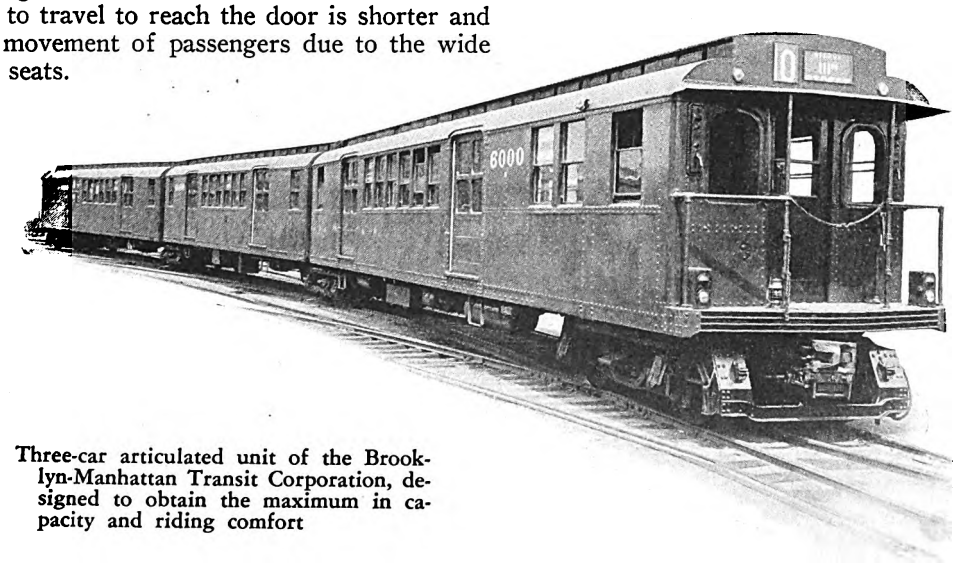
In rapid transit cars, floors of non-slip material should be provided, and door thresholds or other metal parts should be of such a design as to reduce to a minimum the possibility of passengers tripping or slipping. Sufficient stanchions, hand holds or grab handles should be provided to permit a passenger to support himself properly while the car is in motion.

On the question of seats, experts differ as to whether there is an advantage in providing soft upholstered seat cushions and backs, or whether some other seating material is better. In this matter I believe that for city rapid transit service, where the length of ride is comparatively short, leather upholstery is not desirable. Cushions and backs of wood slats, if of the proper contour, are perfectly comfortable and are preferable to leather from the standpoints of sanitation, durability and maintenance.

Provisions For Passenger Safety

It is the duty of everyone connected with car design to take all possible precautions against accidents to passengers and to operating men, including the shop men who maintain the equipment in first-class operating condition. To this end, doors should be provided with collapsible or rubber door bumpers which will permit a person to withdraw his arm or foot, in case he is caught in a closing door. Electric switches or apparatus of any kind which are involved in the operation of the car should be so located that passengers will not have access to them.

The question of weight of equipment is one which should receive careful consideration in the construction



Three-car articulated unit of the Brooklyn-Manhattan Transit Corporation, designed to obtain the maximum in capacity and riding comfort

Digitized by Google

of rapid transit cars. On the basis of a given operating cost per pound per year, it is obvious that the light car is more economical in operation than the heavy car. In addition to the saving in operating cost, there is a saving in first cost in body, trucks and motors. Weight, however, should not be reduced to the point of sacrificing the necessary strength for proper protection against collisions or other accidents. A substantial saving in weight can be effected in the design of any car without sacrificing strength by paying strict attention to the detail and design of small parts where the question of strength is not of great importance.

Boston's Latest Subway Car

In determining details of the present standard car for the Cambridge subway, of which 60 were recently commissioned, the considerations mentioned above governed the selection. The specifications have been published so that I need mention only the doors, which are in number three on a side and located as recommended above.

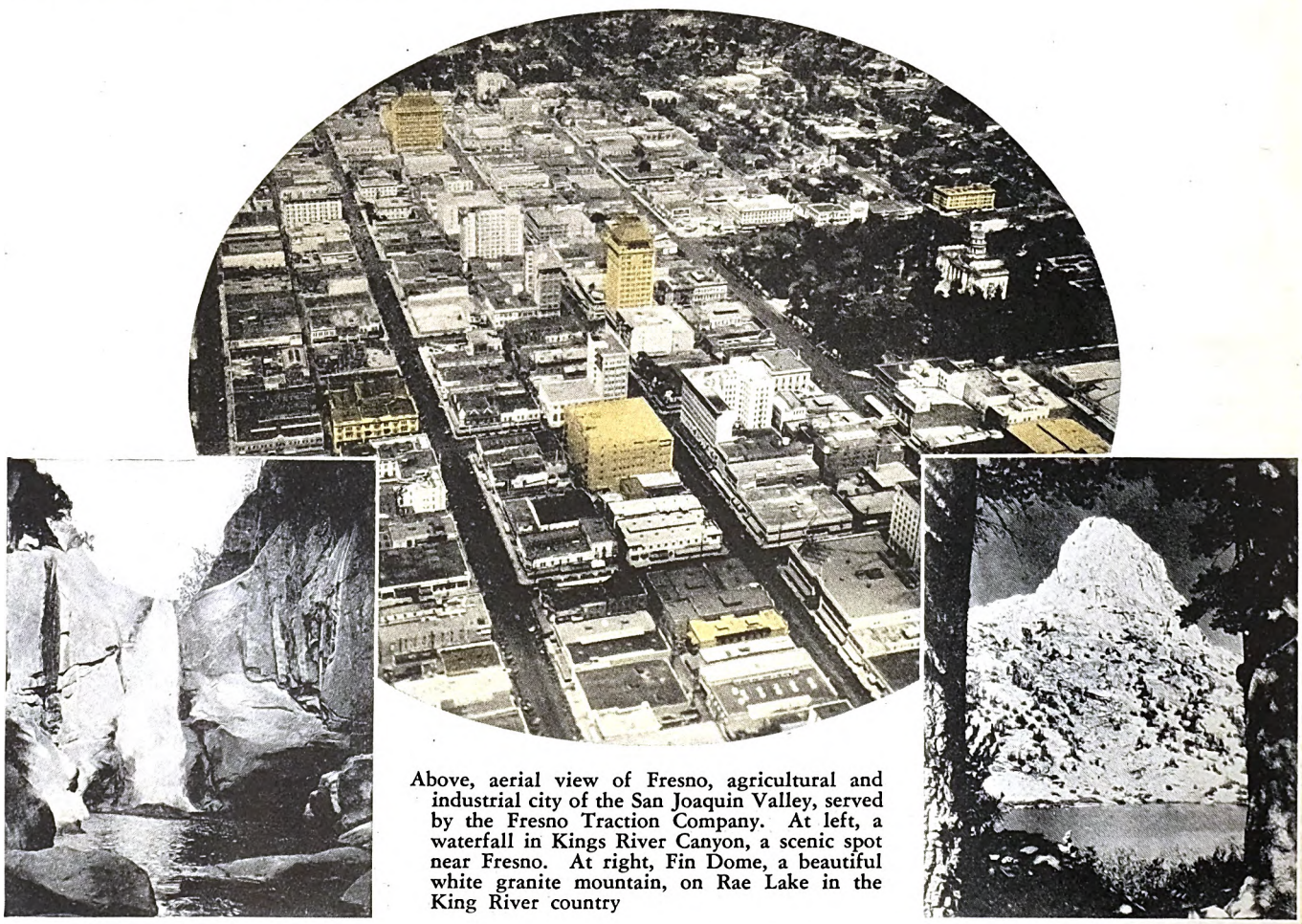
The doors on these cars are of wood, aluminum-covered, arranged to slide on the exterior of body and actuated by electric door operators. The result is light weight, and low original and maintenance cost. Moreover there are no door pockets, and no accumulation of snow experienced in the older type with pockets. The inside width of the car is greater than with inside-hung doors, and the unavoidable waste of compressed air with air-actuated door engines is eliminated, as well as the trouble experienced from freezing and slow door movement in cold weather. As compared with steel doors, these doors are approximately 640 lb. lighter per car.

The electric door operators are located under the seats, with a shaft extending through the side of car. To this is attached a lever for actuating the door. Operators are controlled from push-button groups at the end of the car, as on the earlier cars equipped with air operators. The end doors slide in pockets, but they are outside the gates, and weather stripping is provided to prevent snow from driving into pockets.

A Necessary Form of Mass Transportation

From my outline of the rapid transit problem, there is no doubt as to my belief in and enthusiasm for this form of mass transportation where feasible. Transportation patrons and prospective patrons want to save time. If convinced that they can do this they will limit the use of their automobiles to non-competitive service. Unnecessary time spent in going to and from business is just so much added to the day's work. It is particularly of the worker that I am thinking in this connection. He is usually compelled to travel in the rush hour when travel is at its worst as far as comfort is concerned. The less the duration of his homeward or workward ride, the less it fatigues him. Travel time saved for the patron is leisure time increased. Thus there is a sociological as well as an economic aspect to rapid transit.

The effect of rapid transit upon general living conditions has often been stressed. It cannot be over-emphasized. Rapid transit enables the worker to live at a reasonable distance from his work and under conditions of his own choosing. From the operating standpoint the high speed and the ability to use car and train units of large capacity offsets, under proper conditions, a large part of the increased capital investment involved in rapid transit. Thus densely settled urban communities of large population can have, and should have, rapid transit.



Above, aerial view of Fresno, agricultural and industrial city of the San Joaquin Valley, served by the Fresno Traction Company. At left, a waterfall in Kings River Canyon, a scenic spot near Fresno. At right, Fin Dome, a beautiful white granite mountain, on Rae Lake in the King River country

Digitized by Google

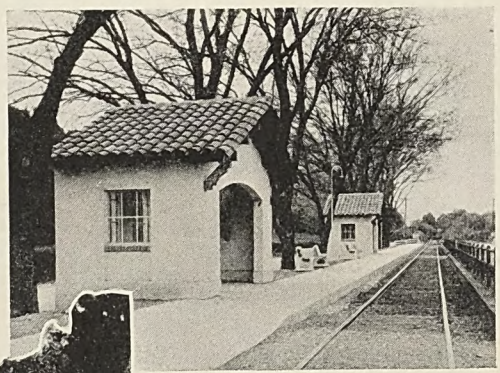
Portland, with majestic Mount Hood in the distance, an important trading center for a large area

Fifth Street, in the heart of Portland's retail district

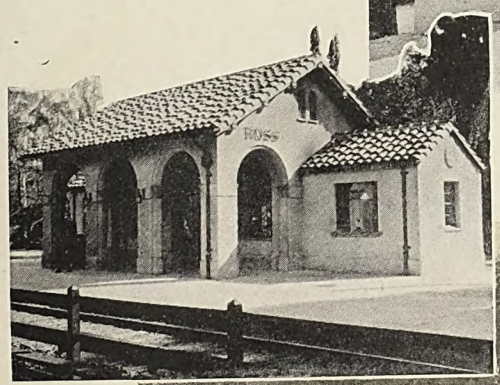
IN order of their importance, successful commutation service must include (1) trains on time, and (2) adequate lighting and heating. The maintenance of train schedules is extremely important to the commuter who must be at his place of employment or business at a definite time each day. Because he uses his time on the train for reading his newspaper or magazine, the commuter must be provided with adequate illumination. Similarly, because he spends time on trains when otherwise he would be in his home, good heating and ventilation, comparable to that in his home, must be provided.

EDWARD H. MAGGARD

President and General Manager
Northwestern Pacific Railroad
San Francisco, Cal

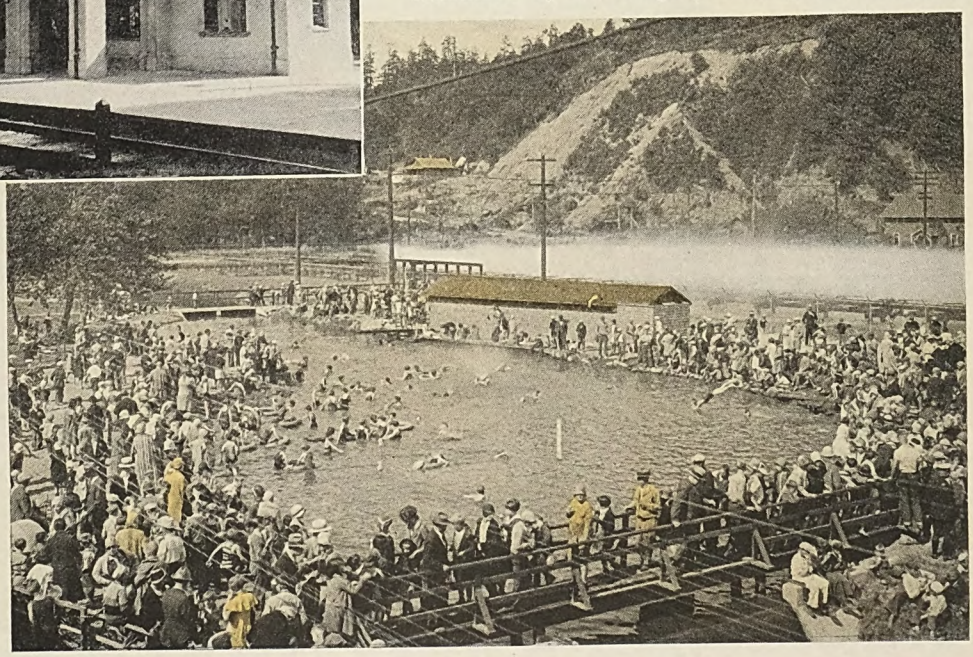


Shelters at Kentfield, along the route of the Northwestern Pacific Railroad

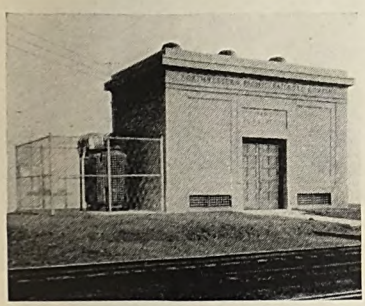


Attractive architecture adopted for the passenger stations of the Northwestern Pacific Railroad

The "Wally Briggs' Swimming Hole" at Electric Park, where the main power plant of the Grays Harbor Railway & Light Company is located. The pool was established by the company's late general manager.



Pine automatic substation of the Northwestern Pacific



Digitized by Google

Digitized by Google

Digitized by Google

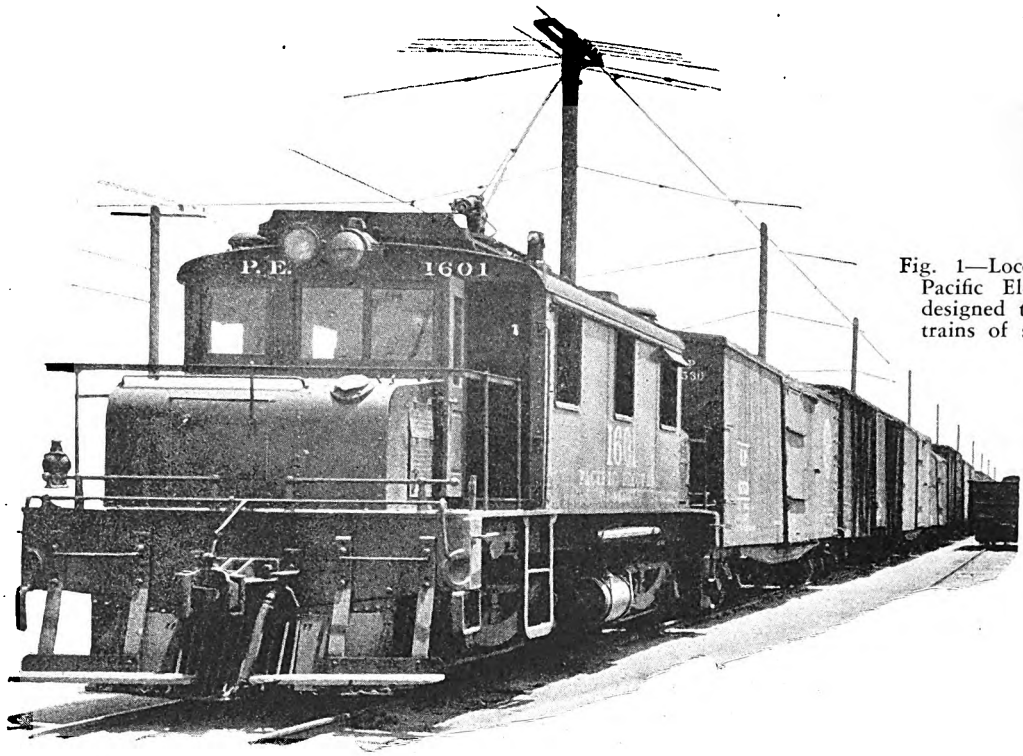


Fig. 1—Locomotive of the Pacific Electric Railway, designed to handle heavy trains of steam road cars

Recent Freight Equipment Trends

MORE PROFITABLE

By

DAVID R. THOMAS

President Electric Railways Freight Company

Cleveland, Ohio

ELECTRIC railways engaged in the transportation of freight have changed their concept of this business and their methods of handling shipments very fundamentally in the past few years. A steady decline of passenger revenue and a new but powerful competitor, the motor truck, have caused them to take every progressive step possible to attract an increasing amount of profitable freight revenue. Definite policies, adopted for this purpose, are clearly indicated by the types of equipment placed in the freight service of the interurban railways during the past year. They show pronounced trends, on the part of these common carriers, toward:

1. Maintaining faster freight train schedules and using cars of greater capacity.
2. Providing facilities for handling steam road cars on electric railway lines and for moving electric railway freight cars over terminal tracks of steam roads.
3. Rendering pick-up and delivery, door-to-door service.
4. Affording container service.
5. Operating truck lines as feeders to rail lines.
6. Paralleling rail lines with truck lines to meet the competition of competing truck lines.
7. Using mechanical equipment for handling freight at terminals and instituting more efficient warehouse and loading methods.
8. Providing automatic accounting machines with which to reduce accounting expense and provide more comprehensive statistical information.

The accompanying illustrations indicate clearly the complete and comprehensive freight service that is the ultimate goal of the electric railways. Fig. 2, for example, shows the trend in equipment toward faster, better-appearing freight motor cars. Greater capacity, too, is being attained in both motor cars and trailers.

The effort on the part of interurban lines, as distinguished from electrified steam lines, to develop connections with steam roads is also evident. Interurban lines cannot handle steam road cars through city streets but they are endeavoring to utilize sections of their systems located on private rights-of-way for this purpose. Several roads have tentative plans to build around a number of the smaller cities to permit a more extensive use of M.C.B. equipment. During the past year, too, arrangements have been worked out whereby steam lines may

Digitized by Google

handle interurban freight motor and box cars through steam road terminal yards. Only slight modifications in the construction of interurban cars were required to permit this operation.

In Figs. 4-8 are shown the different types of truck and trailer units used in electric railway pick-up and delivery service. The 1-ton tractor and 14-ft. semi-trailer, Fig. 4, is an extremely flexible unit and, with the second trailer to be left at the customer's premises while unloading the first at the freight terminal, is capable of picking up and delivering a surprisingly large amount of freight. The units shown, under favorable conditions, handle from 40,000 to 50,000 lb. of freight per day. The 2½-ton tractor and 20-ft. semi-trailer, Fig. 6, is the type of equipment used for large shipments by the Elway Transit Company, a forwarding company in Cleveland.

The truck carrying a Fitch container, Fig. 7, illustrates the flexibility of this container system. Note the similarity between this unit and any closed-body truck. The container may be carried on a highway trailer as well as upon a truck and is transferable to a railway flat car.

Fig. 2—Latest design of freight car, with a capacity of 80,000 lb., placed in service by the Cincinnati & Lake Erie Railroad. It is equipped with four 100-hp. motors and is capable of hauling twelve electric railway box car trailers at a speed of 45 m.p.h.

Assure a BUSINESS

For the most efficient pick-up and delivery service in the larger cities the equipment required may be roughly grouped into three classes:

1. One-ton tractors, each with two 14-ft. semi-trailers for light work.
2. Two-ton trucks for serving customers so located as to necessitate driving through narrow alleys and for using congested dock facilities. Half of the trucks should be equipped with closed bodies, the other half with stake bodies.
3. Two-ton tractors, each with two 18-ft. semi-trailers; one with stake body, the other with closed body. It will be found that the manufacturers of certain commodities insist upon their merchandise being handled in waterproof vehicles. It is difficult to maneuver trailers that are longer than 18 ft. in many localities.

For service in outlying districts the use of two trailers in train drawn by one tractor is found to be most efficient; the second trailer is converted into a four-wheel trailer by means of a dolly. This same equipment is used in handling tonnage between off-line substations and the rail head.

It is becoming more and more evident that freight service from the door of the shipper to the door of the consignee is to become the general policy of the electric railways. This policy is manifested in varying degrees throughout the country. In Western Ohio and Indiana the railways have gone only so far as to absorb from 3 to 5 cents of the shipper's or consignee's cartage cost on shipments conforming to certain specified minimum weights, and commodity classifications. The shippers and consignees provide the cartage equipment.

In Southern California the Pacific Electric Railway has provided for a complete pick-up and delivery service through the incorporation of the Pacific Electric Motor Transport Company. This company was organized for the purpose of carrying on the business of transporting freight, express and other commodities and of conducting a general receiving, forwarding and warehouse business. The rates of the transport company will cover the complete door-to-door service, or service from the shipper's door to destination rail terminal, or from originating rail terminal to door of the consignee. In the Pacific Electric Railway territory, shipments will be

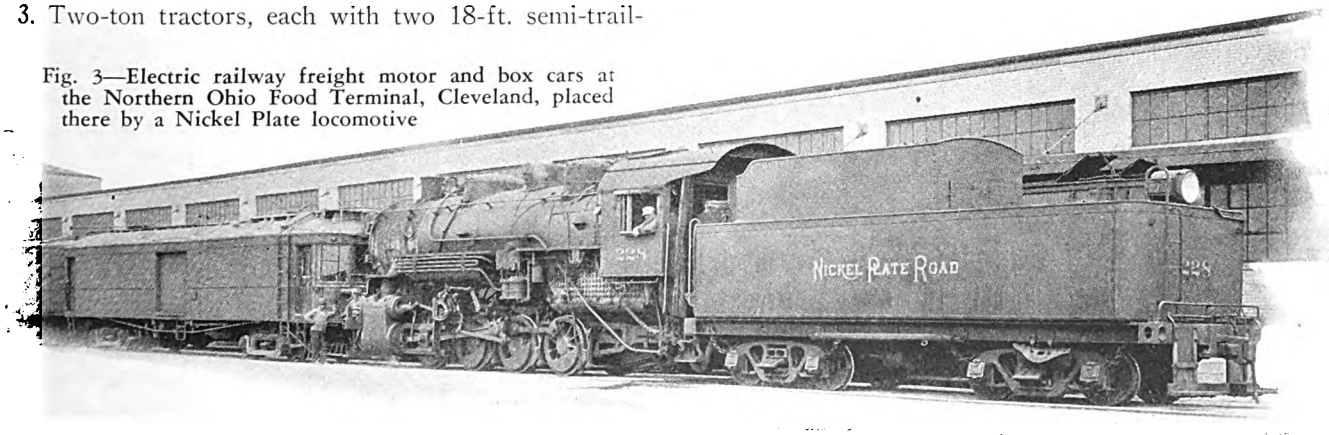


Fig. 3—Electric railway freight motor and box cars at the Northern Ohio Food Terminal, Cleveland, placed there by a Nickel Plate locomotive

Digitized by Google

Digitized by Google

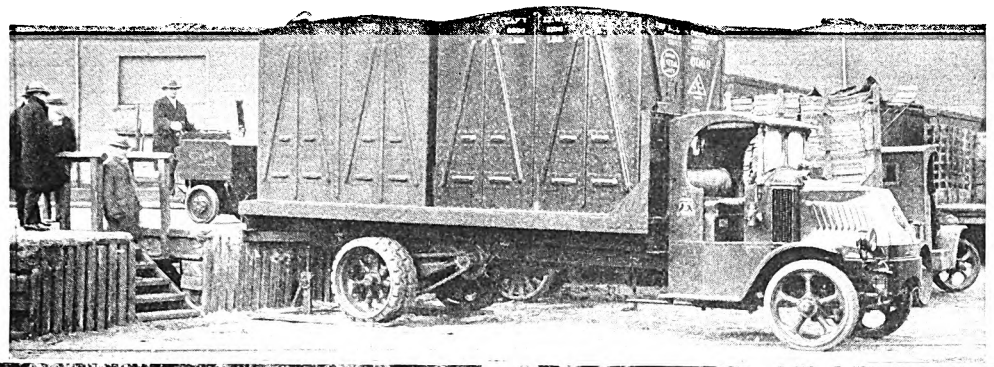


Fig. 9—Using an electric - lift truck to handle L.C.L. Corporation containers

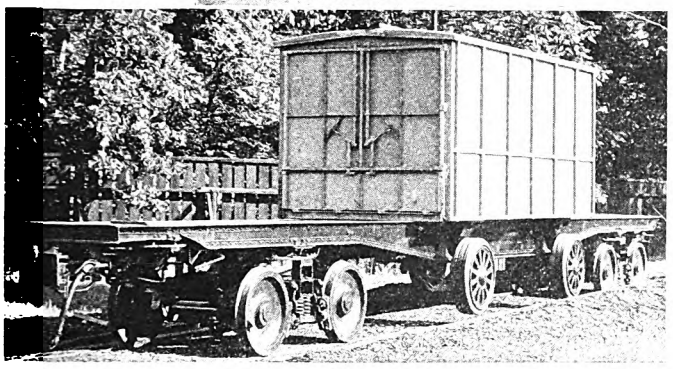


Fig. 10—Trailer of Bonner Railwagon system mounted on railway flat car

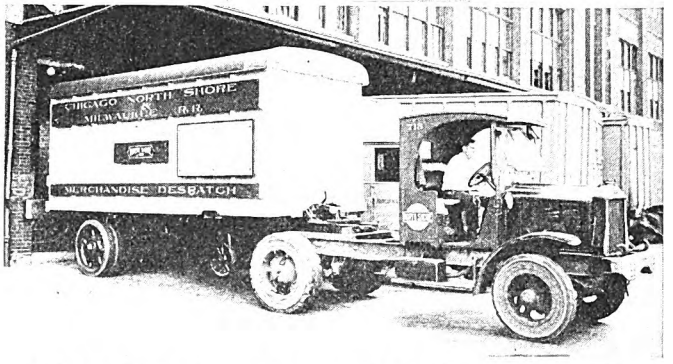


Fig. 11—Type of semi-trailer used by the Chicago, North Shore & Milwaukee Railroad

large shipments moving from one consignor to one consignee, or to several consignees at one destination, and shipments that, if not rehandled at terminals, can be shipped uncrated or unwrapped, are particularly adapted to motor-truck-trailer transportation. The use of containers eliminates 90 per cent of the terminal cost and from 50 to 60 per cent of the pick-up and delivery expense. The container also is, in a measure, a substitute for the steam road side-track, and makes available to the electric railways certain classes of steam road carload business that is not now obtainable because of the handling cost at electric railway terminals.

Figs. 8-11 show the trend of container design. It will be noted that the containers may be divided into two general groups: first, the demountable box type, illustrated in Figs. 8 and 9; and second, the highway trailer type, Figs. 10 and 11.

The box or container of the highway trailer type is in fact a highway semi-trailer that is carried, with wheels intact, upon the railway flat cars. In the Bonner type, Fig. 10, the floor of the container rests upon the platform of the flat car with the wheels suspended on either side of the flat car, below the level of the car platform. The journals of the flat car are placed inside of the car wheels instead of outside, the wheels of the trailer-container occupying the space customarily occupied by the rail car journal boxes, thus maintaining the over-all width of the standard interurban cars. In the case of the units used by the Chicago, North Shore & Milwaukee Railroad, Fig. 11, the trailer-container rides on top of the railway flat car, the wheels of the container resting on the car platform.

In both types described, three trailer-containers, each approximately 18 ft. long, may be carried on one railway flat car. The carrying capacity of each container is 20,000 lb. which permits a pay carload of 60,000 lb.

Several types of demountable containers are now available to the electric railways. The several methods of transferring them from truck to railway car and vice versa include the hoist, electric-lift truck and roll-off. It will be noted that the Fitch container, Fig. 8, is approximately twice the length of the other types of box containers shown. It is 18 ft. long and corresponds to the closed body of a highway truck, the bodies of the containers used by the North Shore, and those of the Bonner system. Three of these containers can be carried on a railway flat car, returning a very favorable per car-mile revenue at a comparatively low container rate. The

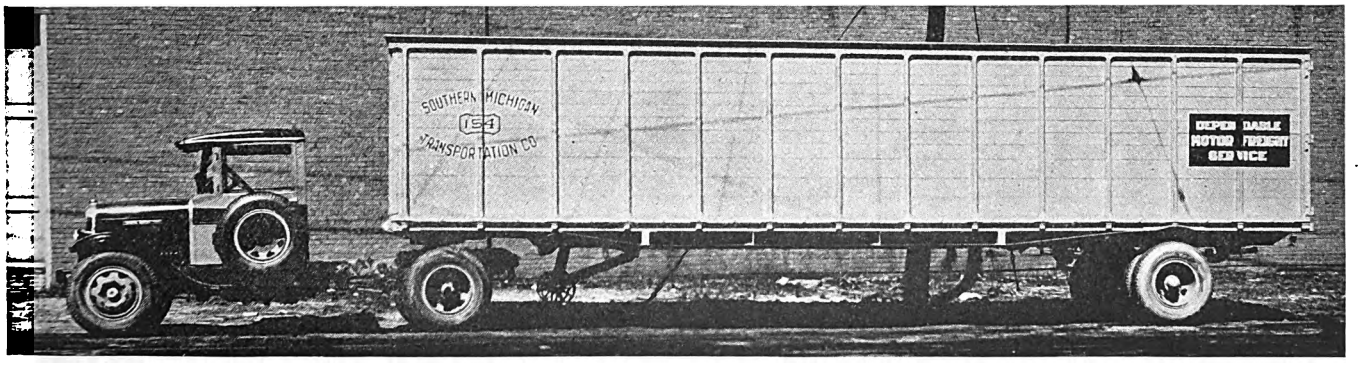


Fig. 12—Thirty-five foot semi-trailer unit of the Southern Michigan Transportation Company, used for hauling light and bulky freight

Digitized by Google

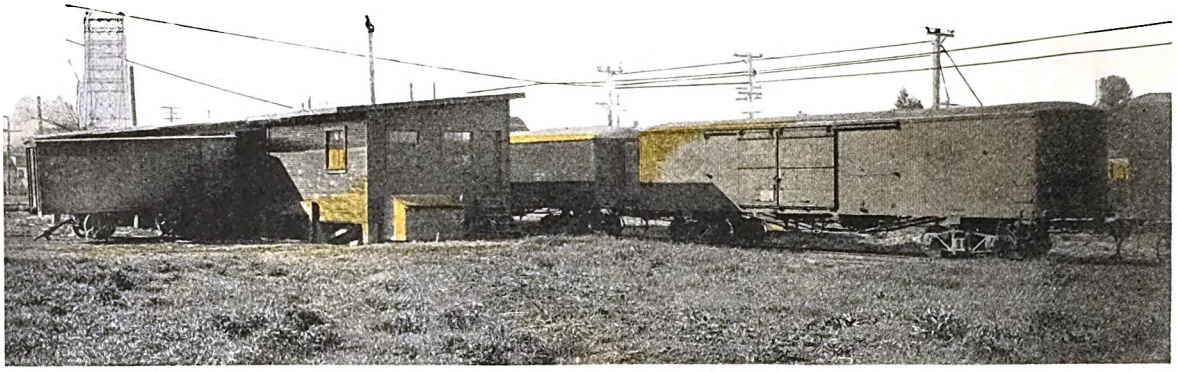


Fig. 13—Railway truck line transfer station of the Lake Shore Electric Railway, Toledo, with a "spot" capacity of four cars

18-ft. container is particularly adapted to meet the competition of the motor freight companies and is an excellent unit to use in connection with feeder truck lines. As a pick-up and delivery unit, the 18-ft. demountable container offers the means of meeting the competition of the side-track facilities of the steam roads.

Several types of highway equipment are now used by the electric railway freight truck lines. Power units usually consist of 2½ to 3½-ton tractors weighing approximately 7,000 lb. and capable of handling two trailers in train. The trailers are 20 ft. long and either of the stake or closed-body type; the second trailer in the train is either a four-wheel unit or a semi-trailer converted into a four-wheeler by means of a dolly. The trailers weigh from 7,000 to 7,800 lb. and have a rated carrying capacity of 7 tons but are capable of carrying from 10 to 12 tons. Fig. 12 illustrates a 35-ft. semi-trailer designed to handle bulky freight such as furniture. Several of these units are in the service of the Southern Michigan Transportation Company, Jackson, Mich.

Fig. 13 shows the Glendale rail-truck transfer terminal of the Lake Shore Electric Railway, located at the eastern city limits of Toledo, Ohio. This transfer has a "spot" capacity of four railway cars and has done much to eliminate congestion at the Toledo freight terminal. Cars loaded and unloaded at this terminal do not pass over the streets of the city.

Fig. 14 — Elwell-Parker electric lift truck depositing skid in freight car

During the past twelve months, a number of electric railways have either acquired truck lines or have entered into traffic arrangements with separately owned motor freight companies. In several instances, too, electric railways have abandoned rail operations and are serving the territory with motor trucks. The Eastern Michigan System, with truck lines radiating out of Detroit, is an example of an organization that is operating motor trucks as feeders to their rail lines, as developers of new territory not served by electric railways, as substitutes for rail lines that have been discontinued and as supplements to existing rail service. The Southern Michigan Transportation Company is giving freight service by motor trucks, having abandoned all of its interurban lines.

Fig. 15—Placing a heavy shipment in a car with an Elwell-Parker warehouse crane

In eastern, central and northern Ohio the Electric Railways Freight Company is directing operations of several truck lines that were recently acquired by the Northern Ohio Power & Light Company. These lines are being operated as feeders to the railways and for the purpose of meeting the competition of other truck lines serving the railway territory. The opinion is held by a number of operators that the railway which renders container service with the truck body type of container will not find it necessary to parallel its rail lines with trucks.

In Figs. 14 and 15 are shown mechanical aids for reducing terminal costs and improving service. The advantages of these are self-evident.

Digitized by Google

Building BETTER *Track*

By
W. W. WYSOR
Chief Engineer
United Railways & Electric Company
Baltimore, Md.

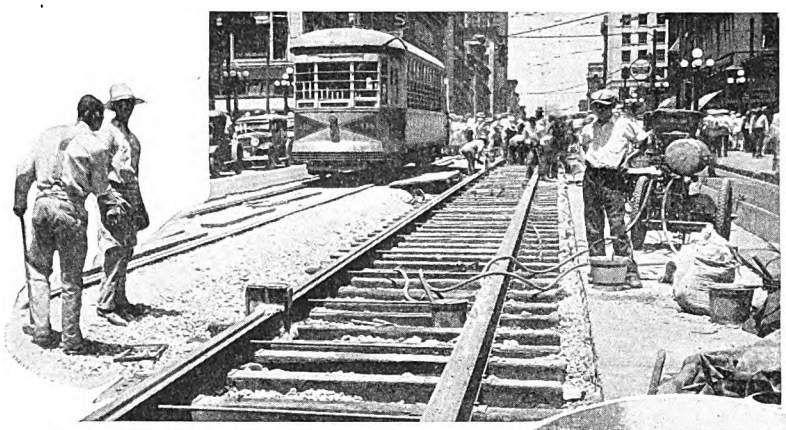
President
American Electric Railway Engineering Association

Tee rail has recently regained a considerable amount of its former popularity for use in street railway track with concrete paving

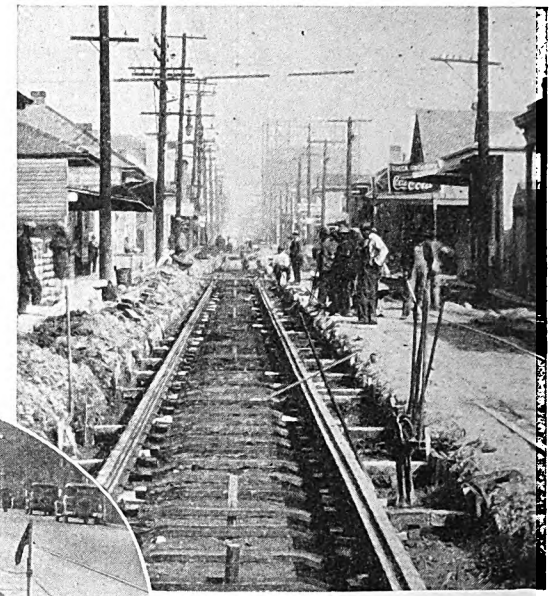
IT IS a far cry from the days of the rumbling stage coach bumping over cobblestone streets to the comfortable and speedy electric railway service of the present day. While the improvements which have been made in the design of the vehicle have attracted the largest amount of public attention, the advances made in the design and construction of roadway have been equally important in improving the quality of service. Today all forms of transportation are judged by the standards set up by the rubber-tired automobile and its attendant comfort. It is of the utmost importance, therefore, that the electric street car be provided with the smoothest and best type of roadbed that engineering skill can produce. To meet this need, numerous changes have been made in design and construction during recent years.

Development of improved rails has been one of the primary factors in the improvement of track construction. Very early in the growth of our cities it became apparent that some more adequate form of public transportation was needed than could be supplied by free-wheeled vehicles. The first street railway was built in New York in 1832 and others the following decade. Boston began the construction of horse car lines in 1856, Philadelphia in 1857 and New Orleans in 1861 and other cities soon after. These were followed by cable lines, the first being built in San Francisco in 1873. Electricity began to be adopted as a source of motive power about 1888. By the time street railways came into general use, the tee rail had been developed as the type most suitable for

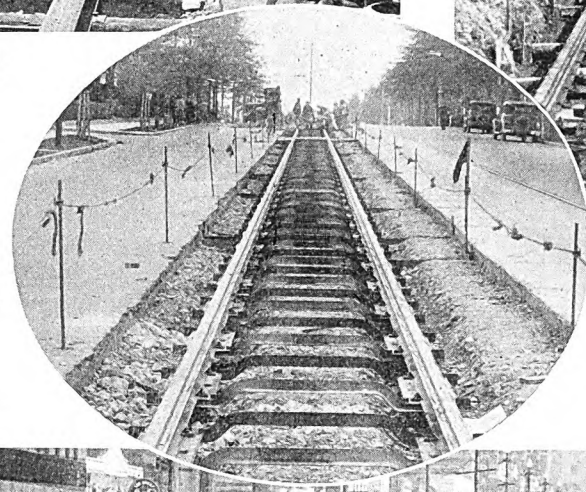
Digitized by Google



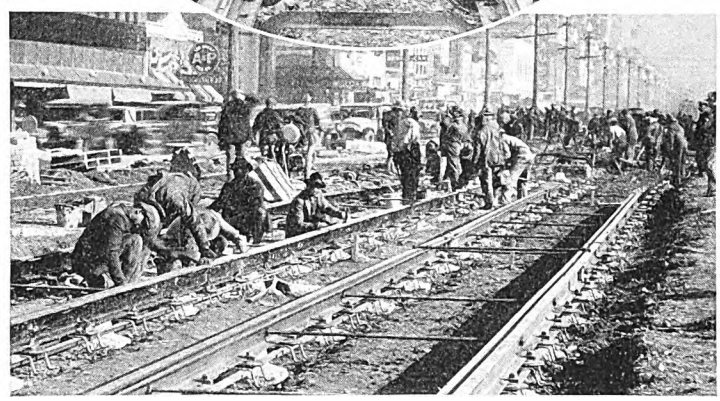
Grooved girder rail on wood ties is widely used in track construction



Combination steel and wood ties are used by numerous railways



A recent development in track construction is the use of bent steel ties



Experimental track built on rail seats without ties

steam railroads. At that period, however, the rails were all of light section, probably not over 4 in. high. This was found unsuitable for paved streets where deep block pavements were generally used, and the so-called tram rail was developed with a greater height and a horizontal lip to accommodate wagon wheels.

With the coming of the cable car and the electric car, speeds were increased as well as the frequency of service. This made it undesirable for free-wheeled vehicles to use the car tracks. At the same time smoother pavements were coming into extensive use so that there was not the same necessity for vehicles to follow the car tracks that had existed in the early days. The next development after the tram girder rail was a grooved type of rail known as the "Trilby" because the head portion of the rail when inverted resembled somewhat the Trilby type of lady's shoe then in vogue. The Trilby type of groove has since been modified to a groove which gives a better clearance for wheel flanges.

While there are a number of different grooved girder sections being rolled today, the one most commonly used is that adopted several years ago by the American Electric Railway Engineering Association as standard. This is made in sections either 7 in. or 9 in. deep. With the increasing use of concrete paving, however, the use of a tee section has regained a considerable measure of popularity. Several types of plain girder or tee rails have been adopted as standard by the A.E.R.E.A. There is also available a rail, first rolled for the Cleveland Railway, which is non-symmetrical in gage, the backside of the head being sloped in a manner similar to the head of the girder grooved rails so as to make a better job in paved streets.

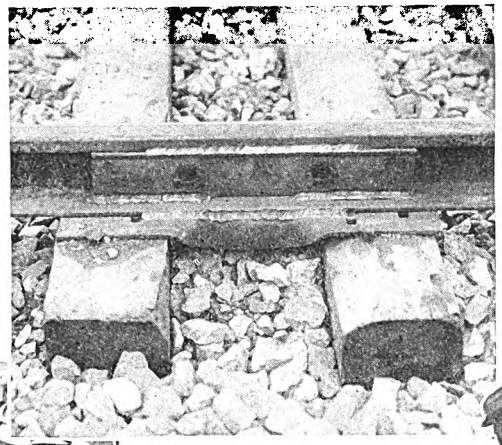
In general there has been a trend toward the use of heavier rail. Heavy rail gives track a longer life not only because there is more metal to resist wear but because it spreads out the loads and due to its anvil-like action absorbs the shocks, thus protecting the balance of the track structure as well as the surrounding pavement.

The increasing of wheel loads, car speeds, volume of traffic and also heavy motor trucks has resulted in the building of more substantial track foundations. While wood ties continue to be used more extensively than any other type, steel ties and combination designs have many adherents. Many companies have also adopted concrete in the track foundation, especially where steel or combination ties are used. To obtain greater density and closer union between the concrete, ties and rails, a number of railways have adopted the practice of vibrating the concrete thoroughly before it sets. This is not a new idea but new machinery for doing the vibrating has recently been developed.

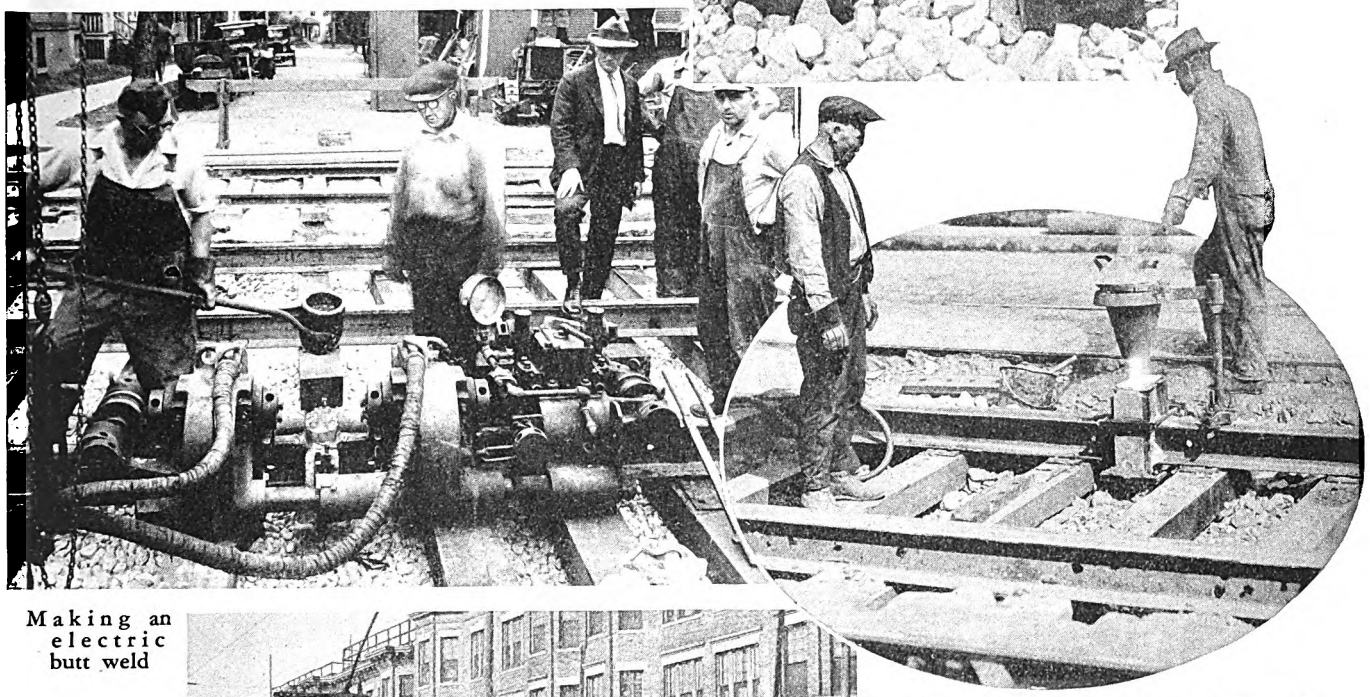
One feature of track construction that has probably caused more concern than any other is the method of joining rails together. In the old days the street railways followed the steam railroad practice of using fish plates,

Digitized by Google

and the various modifications including base plates and so-called continuous plates. However, on account of the difficulty in getting at joints buried in street paving, the troubles of the street maintenance-of-way man were intensified over that of his steam railroad brother when it came to maintaining joints. While the paving around street railway tracks is the source of a great deal of annoyance and expense, it does make feasible the practice of welding of rail joints. Thus we now have indefinite lengths of track, welded solidly so that it is, in effect, one continuous rail. The paving not only tends



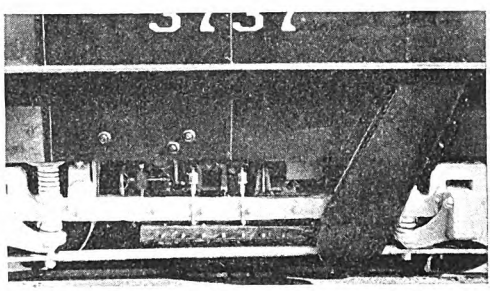
Typical electric seam welded rail joint



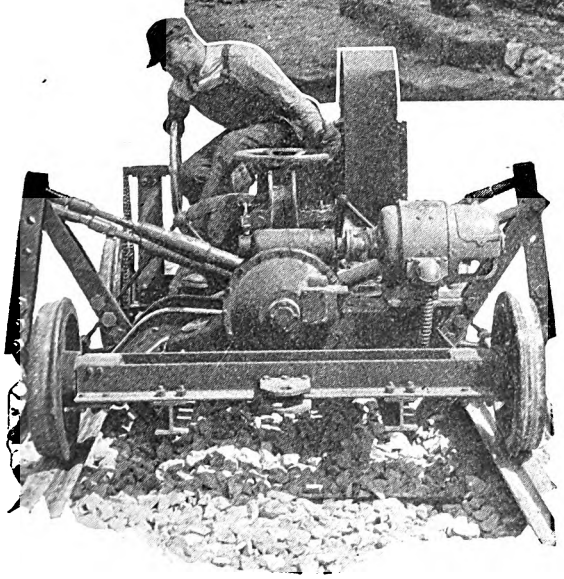
Making an electric butt weld

Thermit welded joints are widely used

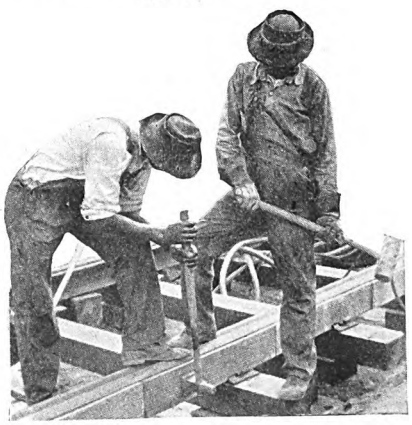
Vibrating track concrete to give added strength



Reciprocal rail grinder mounted on car



Automatic ballast tamping is a recent development



Plastic rail filler helps to prevent transmission of vibration between rail and pavement

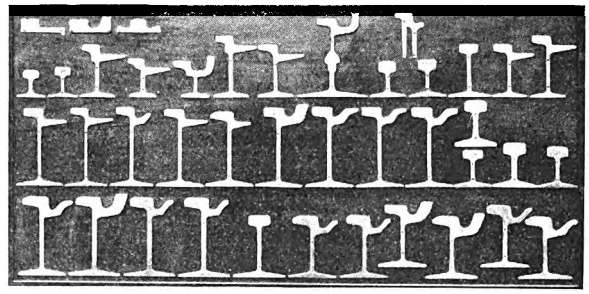
Digitized by Google

to keep down the extreme changes in temperature but confines the rail in such a way that it cannot buckle out of line and the stresses set up in the rails due to temperature changes are under the elastic limit of the rail steel.

The first method of welding rails together was by means of cast iron binding. There was, however, little actual weld in this case, the iron binding acting more through its gripping effect than through any actual fusion with the rail. Nevertheless, these cast-iron welds were remarkably successful. These gave way to the electric bar weld, the Thermit weld, the electric butt weld and the electric seam weld. Practically all the street railway track that is laid today is welded by one or the other of these processes, all of them being efficient but each having its own advocates and special applications. The welding of joints has prolonged the life of rails so that they can be used until worn down throughout their length instead of being scrapped when worn out at the joints.

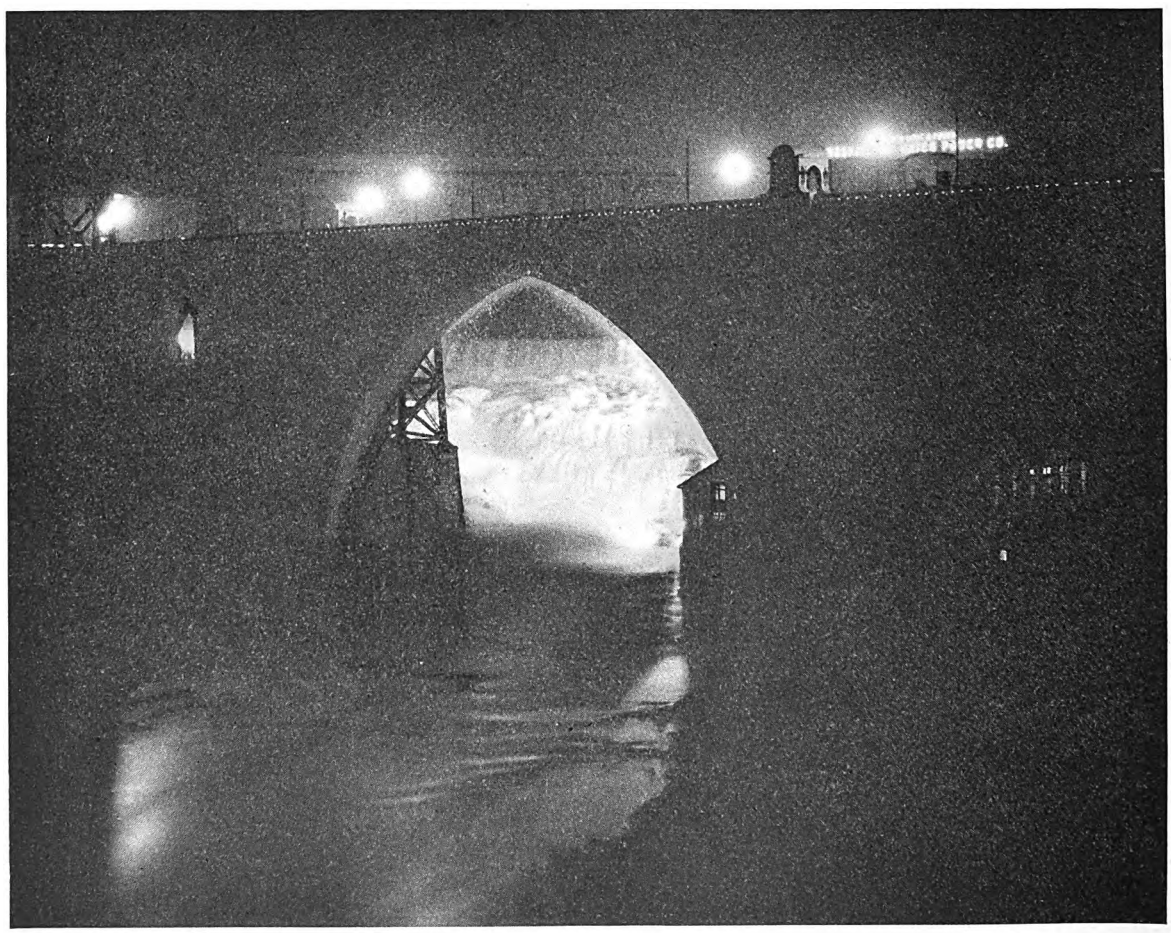
In addition to joint welding, extensive use has been made of arc welding for building up worn spots in track. This welding can be done at a nominal cost and it has resulted in the saving of large sums of money.

Many improvements have been made in recent years in the design of special trackwork. When street railways first came into use, it was soon found that the switches used by steam railroads were not suitable for paved streets and what is known as the tongue switch was developed. This was a more or less crude affair at the start, as was also the other special trackwork. Frogs were either made by bolting together plain rails and cutting notches for the wheel flanges, or were made of cast iron. The sharp curves necessary in negotiating street corners were guarded with strap steel or specially rolled light guard sections secured to the running rails by bolts. These answered the purpose for a time but much difficulty was had in keeping these guards securely fastened and so there was developed a form of girder rail having a solid guard. This is a tremendous improvement over rail with a bolted-on type of guard. Great improvement has also been made in the method of making frogs. These are either made of high-grade alloy steel or of what is known as the iron-bound type with hard center inserts.



Development of rail as used in Baltimore from the earliest horse car days up to the present

We must bestir ourselves to hold our patronage by giving to our passengers the closest approximation we can to the comfort they enjoy in "riding on rubber." If we do not, we may expect to see them drifting away in greater numbers. All the time and efforts of the way engineer have been directed toward developing a type of track that will accomplish this and at the same time will give maximum length of service at minimum cost.



Spokane Falls at night, a picturesque scene in the center of the city

Digitized by Google

Suburban station on the newly-electrified Lackawanna system, showing the attractive type of suburban territory served

Serving the SUBURBAN COMMUTER

By

MORRIS BUCK
Engineering Editor
Electric Railway Journal

PROMINENT among the transportation facilities which have contributed to the development of many of our modern American cities is the suburban service offered by the main line railroads. Begun within a comparatively few years after the steam locomotive had been invented and the railroad had become a reality as a means of travel, suburban service has been developed more and more intensively, until today it stands in a distinctive class as one of the essential transportation facilities of the large community.

At the outset, the use of the available facilities of the steam railroads for commuter traffic seemed logical, both to the residents of the cities and to the managements of the roads themselves. Nearly every system entering a city of any size, particularly where a terminal was located, had obtained a choice site for a passenger station. In the days of railroad expansion it was considered essential to locate such a station as near as practicable to the center of business activities. At a time when freight traffic was comparatively light, little difficulty was experienced in scheduling passenger trains at convenient hours to serve the needs of executives and office and factory workers who desired to live along the line of the road. Since it was considered that the tracks and other facilities would have to be provided anyhow in order to handle through passengers and freight, it was only natural that reduced rates were offered to induce regular riders to use the suburban service which could be given with relatively small additional investment. Monthly, quarterly and annual tickets have been sold at rates far lower than the regular one-way fares, sometimes as little as one cent a mile if all the rides on the tickets are used.

As a consequence of this policy, in many cities a large business has been built up that has become an essential part not only of the railroad system, but of the community. In some instances it has brought a profit to the railroads and in others it is questionable today whether the service is operated at a profit or at a loss. But in any event, the growth of the communities has been fostered by this activity of the railroads.

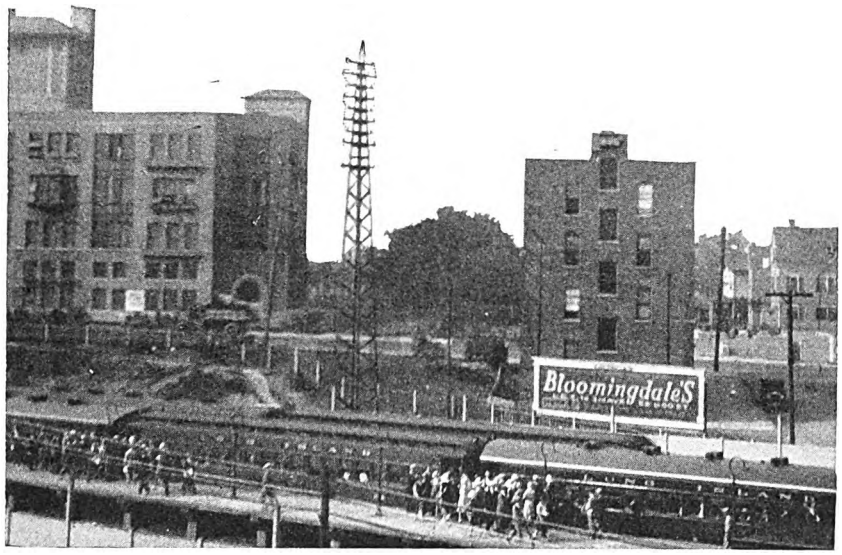
Generally speaking, suburban railroad service antedated the street railway, and was operated for many years before there was a thought of the use of electricity as a motive power. At first, the ordinary passenger coaches and locomotives were employed, but later some of the railroads developed locomotives which were able to produce higher acceleration rates and coaches which were particularly fitted to the needs of commutation service.

Under conditions of a generation ago, with no other

Digitized by Google

form of rapid transit available, the suburban service of the steam railroads furnished the only means through which the worker in a large community could live very far away from his business. With convenient terminals, it was quite possible for workers to spend a comparatively small amount of time in travel and reach points offering the advantages of country or suburban life. While the cost of transportation to the individual was not negligible it was not so high but that a considerable class of people found it possible to build homes at distances of 5 to 20 miles from the congested area. Naturally it was the more substantial element of a city that did this. As a result, the steam railroad has always had a high class clientele for its suburban business.

While the advent of electricity opened up many new possibilities for railroad suburban service, comparatively few systems adopted the new motive power at once. Those that did so were forced to it by public opinion or by legislative enactment. Even today a number of railroads are continuing steam service for this class of traffic with a considerable measure of success. The most progressive ones, however, have electrified in order to cope with the demands for rapid, clean and frequent service.



Woodside, one of the principal junction points on the Long Island Railroad, uses flush platforms

It is well to look into the possibilities of railroad suburban service as compared with those of rapid transit lines of the ordinary type. Naturally, speed is one of the prime essentials of suburban roads of either type. As to convenience, in some respects the rapid transit line probably has the better of it, since it does not need a single terminal in the heart of the city, but can operate through the entire length of the business district with stations at many convenient points. Against this, the main line railroad offers the advantages of comfort and a time-table which may be adhered to rigidly. As a rule, seats are provided for all passengers and many facilities are offered for the comfort of passengers. such as wider cars with cross seats, better upholstering, better lighting and ventilation, and smoking compartments, which are lacking in the more intensive rapid transit service. The fares being materially higher, undoubtedly the best class of travel is attracted to the suburban railroad, and this makes it necessary to do many things to keep the good will of the riding public.

Granted that railroad rights-of-way and facilities are available, it is much more logical to develop them for suburban service than to build competitive rapid transit lines, particularly subways. Accordingly, if a railroad already serves the territory it would appear much better and decidedly cheaper to electrify it and if necessary to construct short sections of subway in the business districts to provide for the distribution of passengers. This plan has been adopted in the electrification of the Pennsylvania Railroad in and about Philadelphia. Suburban trains will be diverted to a subway reaching the central district.

Suburban service has been of much benefit to Philadelphia. When the Pennsylvania electrified its main line a number of years ago, it opened up a territory for some 20 miles to the west of Philadelphia for commuters working in the city. This section has grown remarkably. Following closely on the conversion of this route, the Chestnut Hill branch was electrified, with a quite similar development of the territory served. The line to Wilmington was equipped about two years ago and is at present undergoing an increase of business. With the complete electrification of the Pennsylvania system between New York and Washington, suburban service will be given electrically as far as Trenton, and further growth of the communities along the line is anticipated. Electrification of the suburban lines of the Reading Railroad, which is now taking place, will put this system on a par with the Pennsylvania as a means of serving suburban residents in and about Philadelphia. In all these installations the exclusive suburban character of travel has been retained, so that there is no direct competition with the city-owned subways and elevated lines.

Suburban trains are operated successfully in several places on the Pacific coast by the Southern Pacific System and its affiliated lines. Views of the Alameda-Oakland lines appear on page 370.

Another possibility for the utilization of existing facilities for intensive service is to connect them with existing rapid transit lines for distribution of passengers in the business district. This has been urged many times. There are, however, comparatively few instances where the plan has been worked out. The most notable of them is the Ashmont extension of the Boston Elevated Railway's Cambridge-Dorchester subway. This route, with the surface trolley line extension to Mattapan, is nearly all on the right-of-way of the New York, New Haven & Hartford Railroad. The route has been equipped for rapid transit service at a cost much less than would have been necessary to build a competing subway. The capacity has been increased far beyond anything possible with steam traction, or even electrification of this one line as a part of the railroad service. It must be remembered, however, that in developing the line in this manner its character has been changed completely, and true rapid transit service is now being furnished instead of suburban commuter service. Steam railroad facilities are also to be used for rapid transit purposes in Cleveland. There several railroad lines are being electrified to form a rapid transit system entirely apart from the surface car system.

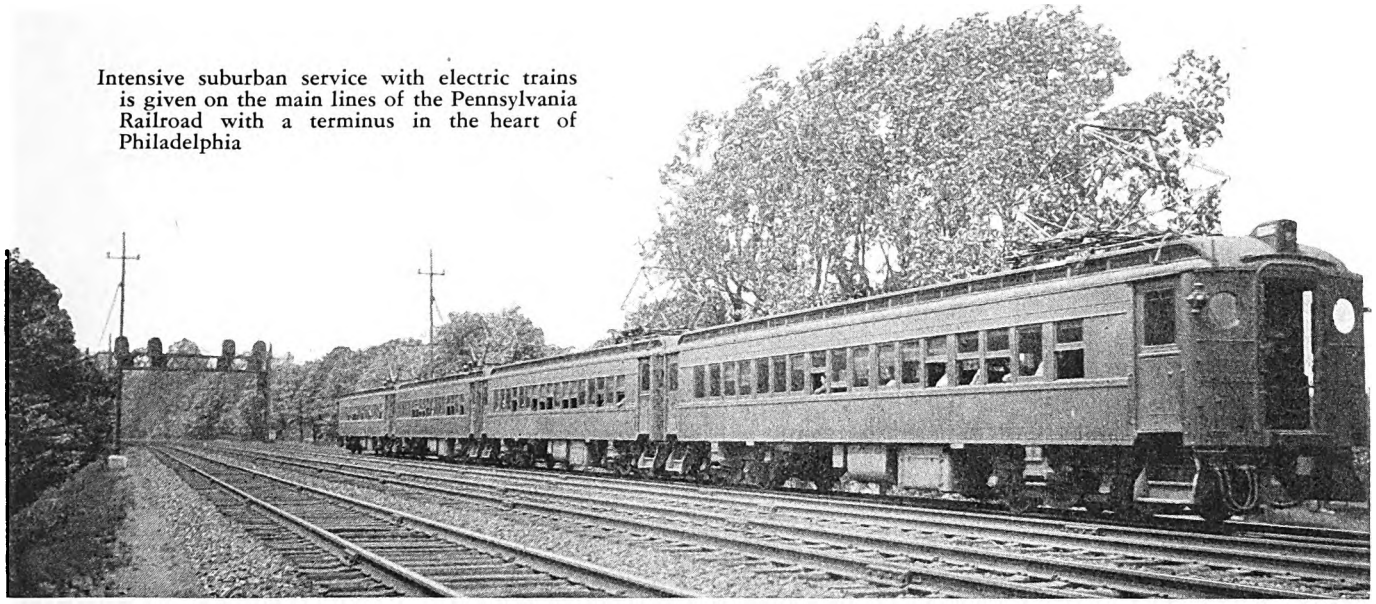
Digitized by Google

As a community builds up, naturally it becomes impossible to continue giving the same class of suburban service as was possible with low concentration of population and small amounts of traffic. As the demand grows, the congestion increases. Trains must be made longer and headways shortened until the service automatically approaches that given by rapid transit lines. This is what has occurred on the Long Island Railroad, serving principally the Borough of Queens in New York City. The Long Island Railroad has been faced with the necessity of providing what is virtually rapid transit service to the detriment of the riders who desire to travel to suburban points outside the city.

Under present-day conditions successful suburban service demands electric operation. The traffic densities are almost invariably too great to permit of satisfactory service with steam locomotives. Use of multiple-unit trains will increase the capacity of a stub terminal from 20 to 30 per cent, while with a through terminal or a loop station the increase in capacity may be even greater. With multiple-unit trains many of the problems involved in locomotive operation are entirely absent. Maximum acceleration can be obtained along with reasonably high speeds so that running times can be shortened materially. With electric heating and lighting of the cars, there is no necessity for frequent trips to a terminal or roundhouse, and the cars can be operated with little or no attention, save for periodic cleaning and inspection. Absence of smoke and dirt also have been popular.

As to the best type of equipment for suburban service, there is comparatively little diversity of opinion. Most of the roads use coaches of the ordinary steam railroad type, all or a portion being equipped with electric motors and control, the others being used as trailers. In a few instances, notably the Illinois Central Railroad, cars of a distinctive type have been developed for suburban service. All the cars have been designed for use with flush station platforms. These are desirable, as they save several seconds at each stop and make it easier for passengers to board and alight. On nearly all of the other railroads giving suburban service there are low station platforms, only a few inches above the rail level. On the Long Island Railroad a considerable number of the stations have flush platforms, while others have low platforms. This necessitates the use of trap doors which must be raised by hand at stations with low platforms.

A distinctive feature of railroad suburban service that has contributed much to its popularity as compared with rapid transit is the adoption of time-tables of the steam railroad type which make use of individual combinations of station stops for each trip. Trains may be run local for the entire distance, express for the entire distance, or there may be a combination of the two types of service on any train. A careful traffic analysis is made and the schedule is adapted to the requirements for that particular trip. If the headways are greater than the minimum it is thus possible to give a superior service, even though only a single track is available in each direction. This is distinctly contrary to the principles of rapid transit, where all trains of one class stop at certain designated stations, locals stopping at all local stations and expresses stopping at express stations only. As traffic density increases, however, it becomes more and more difficult for a suburban railroad to give more than a single class of service on one track and, as stated elsewhere, standard rapid transit operation is approached.



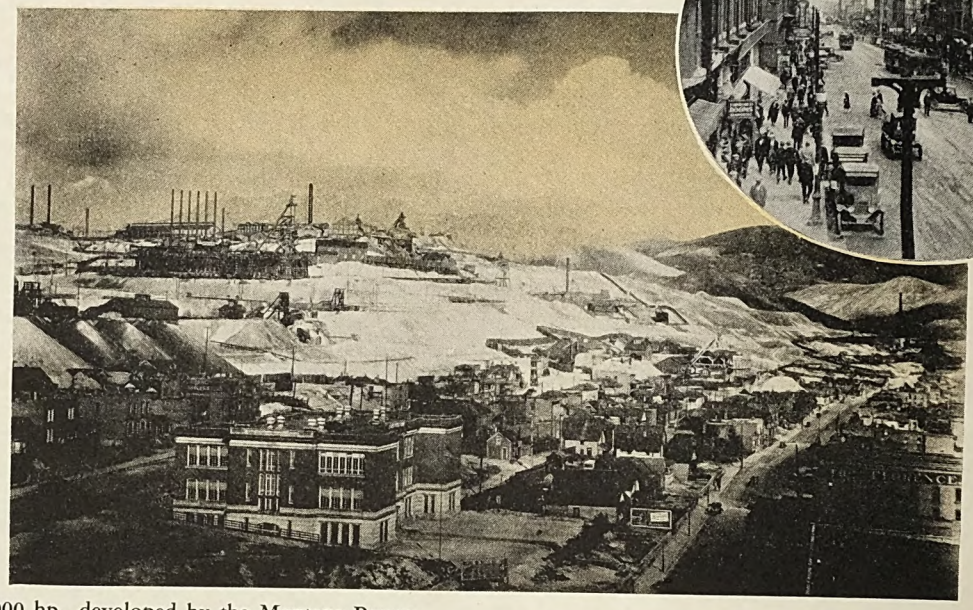
Intensive suburban service with electric trains is given on the main lines of the Pennsylvania Railroad with a terminus in the heart of Philadelphia

One element of cost that has a great deal to do with the difference in operation between trunk line railroad suburban service and rapid transit is the method of payment for labor. Rapid transit trainmen are almost always employed on an hourly basis, while trainmen in railroad service are paid on a mileage basis. This makes it possible for the railroads to schedule trains with much more flexibility. Coupled with greater lengths of route, favorable time-tables can be made up with minimum labor cost and with little waste service during the non-rush hours.

The length of the commuting zone varies with the type of community and the service furnished. Some roads have catered to this class of service in one or more communities and accordingly have built up larger or smaller districts, suburban in character and tributary to the central district. Striking differences have existed on this account in comparable territories. For instance, the writer knows of one example where two parallel trunk line railroads pass through quite similar territories. One of them gave an intensified local passenger service and as a result developed suburban towns on an average of one to two miles apart for a distance of 40 miles, while the other one had practically no suburban development along its line.

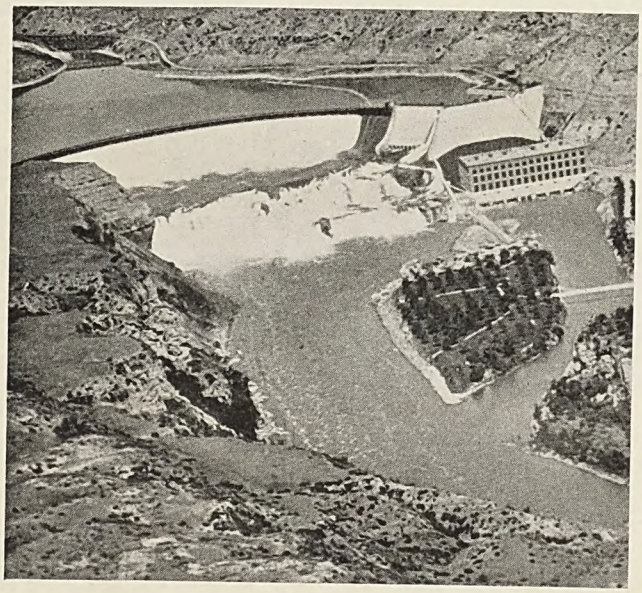
Digitized by Google

The "richest hill on earth," at Butte



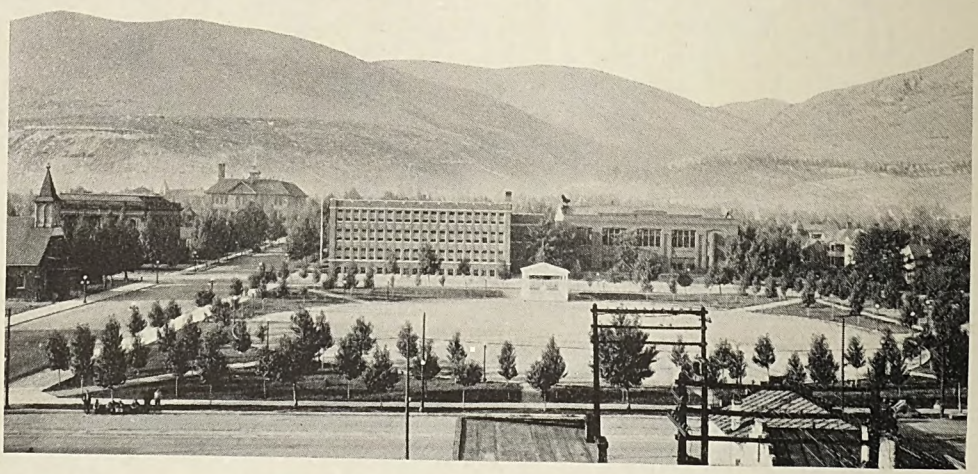
East Park Street, in the business section of Butte, where local transportation is furnished by the Butte Electric Railway

One of the four hydro - electric plants with a total capacity of 240,000 hp., developed by the Montana Power Company on the Missouri River in the vicinity of Great Falls, is shown below



Utah Agricultural College at Logan is in the territory served by the Utah-Idaho Central Railroad

City Common of Anaconda, maintained by the Anaconda Copper Mining Company, which operates the street railway system



Digitized by Google

"NET" can come from two sources—increased earnings or decreased expenses. Improvements in design can bring about both. For some time past we have been attempting to attract riders through improved appearance, riding comfort and speed.

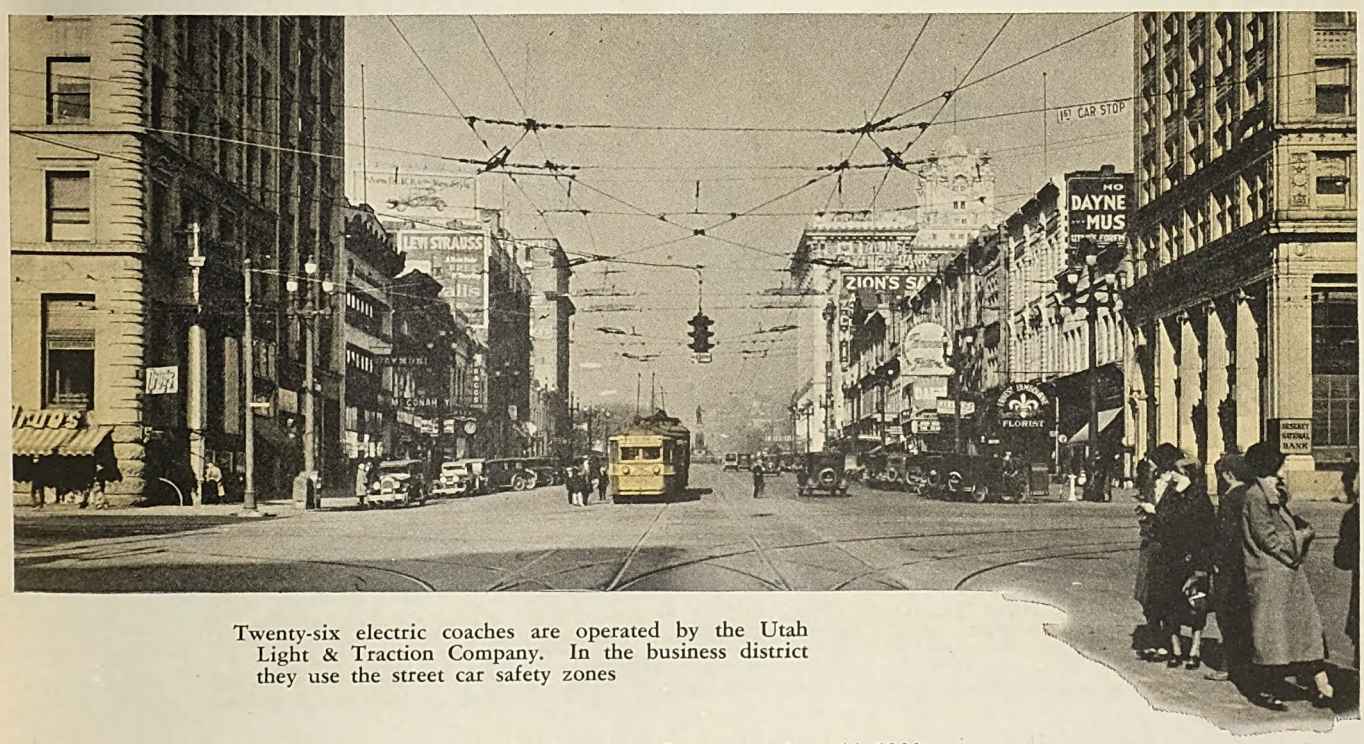
The electric coach attracts riding not alone because of its appearance and comfort, but largely because the rider is impressed with a sense of speed. A modern street car on a good track furnishes a comfortable ride, but a rubber-tired vehicle with its flexibility, quietness and light weight, permitting rapid acceleration, very nearly approaches the ideal mass transportation unit for the average city.

E. A. WEST.
General Manager
Utah Light & Traction Company
Salt Lake City, Utah

Main Street, Salt Lake City, looking north toward the Capitol

One of the electric coaches in Utah's capital city. The famous Mormon Temple is in the background and the statue of Brigham Young is at the right

Modern interurban terminal at Salt Lake City, used by the Bamberger Electric Railroad, which runs north to Ogden, and the Salt Lake & Utah Railroad, which extends south to Payson



Twenty-six electric coaches are operated by the Utah Light & Traction Company. In the business district they use the street car safety zones

Digitized by Google

The co-operative installation or use of ornamental poles for the support of overhead structures occasions a favorable public reaction

Increased Power Department Responsibility Demands PROPER EQUIPMENT

TODAY the activities of the power department of the average modern street railway extend far beyond the responsibility of supplying, through a system of distribution and contact structures, a continuous and economical source of propulsion energy for the movement of cars. The leaders in the industry acknowledge this and, therefore, no longer feel that the scope of power development responsibility ends with the production and distribution of electrical energy, but that it has a real place and constitutes an important part in the general scheme of building up and maintaining friendly relations with patrons of the company and the public at large.

The question is then asked: What are the conditions or qualifications necessary to enable the power department to fulfill best its place according to the modern conception, wherein the sphere of departmental responsibility has been increased?

Primarily these may be classed as follows: continuity of power supply; modern equipment and practices properly maintained; a company policy regarding the public in general, wherein the department, as a unit of the entire company, recognizes and fulfills its responsibility to the public as well as to the company through a more or less definitely prescribed company channel.

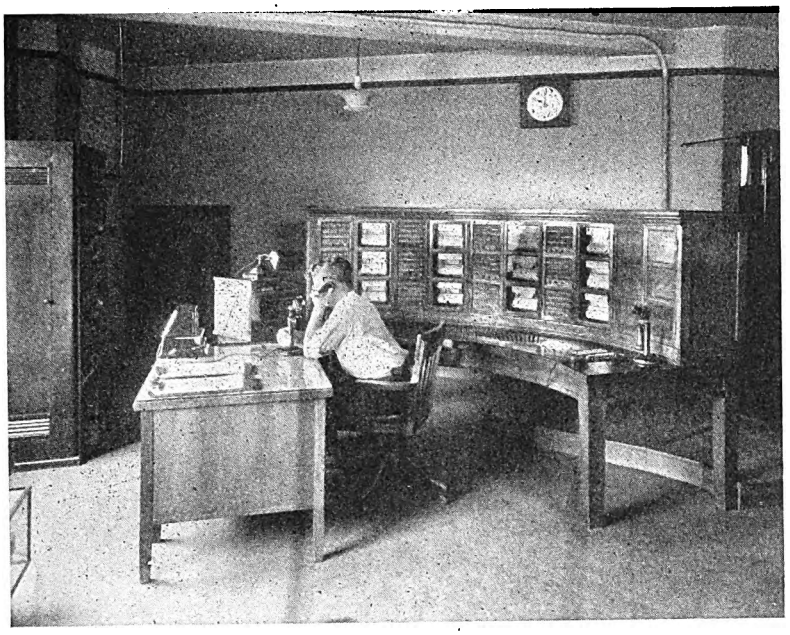
In perusing the three major qualifications and realizing that the one incentive behind the whole structure is to build up a business by demonstrating the ability and desire to serve, one cannot but realize that accomplishment of the desired end is at least impracticable, if not impossible, should any one of the three qualifications be absent.

Dependable service cannot be rendered if the source of power frequently fails. Continuity of power supply cannot be maintained utilizing antiquated equipment or antiquated operating and maintenance methods. Harmonious public relations cannot be maintained if the foregoing qualifications are not fulfilled. On the other hand, the most modern methods and equipment rendering 100 per cent service cannot discount the ill effects of poor public relations or an antagonistic local governmental body. Therefore, one or even two of the qualifications without the third will be of no avail. The triad must exist. In this article it is the intention of the author to discuss briefly only one of these qualifications; namely, modern equipment and practices.

The electric railway industry has witnessed no development quite so revolutionary and far-reaching as the perfection and adoption of the automatic substation. During the sixteen years since the first station of this type was placed into operation, the cost of power delivered to the car has been decreased, accompanied by increased reliability of service and greater freedom from labor

Digitized by Google

troubles on systems where the automatic plant has been installed to any extent. In interurban service this type of plant, even in its simplest form, has demonstrated its ability to render satisfactory performance at a material decrease in operating costs when compared with operating costs of the former manually operated plants. In metropolitan service a full complement of automatic equipment, operated in conjunction with remote and supervisory control and a properly designed distribution system, establishes a power system which, because of its many power supply points located advantageously about the entire system and its extreme flexibility, guarantees a continuity of power supply to the system that can be accomplished in no other way and at a lower cost of power at the car than was possible with former methods of distribution.



Remote and supervisory control, utilizing various colored lamps for indicated condition of conversion and distribution system control equipment

The mercury arc rectifier has advanced to a position where, in certain types of service, definite advantages may be gained by its use. The efficiency characteristic of this device at fractional loads causes it to be particularly well adapted when, for a greater percentage of the time, the nature of the load is such that the equipment is but partially loaded. The rectifier, in its simplest form, is less complicated and less costly to install than rotating equipment installed for automatic operation. The cost of maintenance should likewise be lower. However, when considering major sources of power in metropolitan service, additional features which must be considered in many instances invalidate the advantages of the rectifier and cause rotating equipment to be selected. Paramount among these features is the fact that conversion equipment in this class of service is generally operated at or near capacity as long as it remains in service, particularly if automatic control is employed and the stations and distribution system are under remote and supervisory control. Furthermore, to protect fully the operation of the rectifier in major plants, duplication of the water cooling system, employing some form of recirculating system in addition to the normal supply of water from the city mains, would be necessary. Likewise, serious telephone interference is very apt to be encountered when rectifier equipment is operated in metropolitan areas. Prevention of such a condition would necessitate the installation of additional apparatus not required with rotating equipment.

With the advent of the automatic substation has come not only an entirely new type of housing structure, but

land PRACTICES

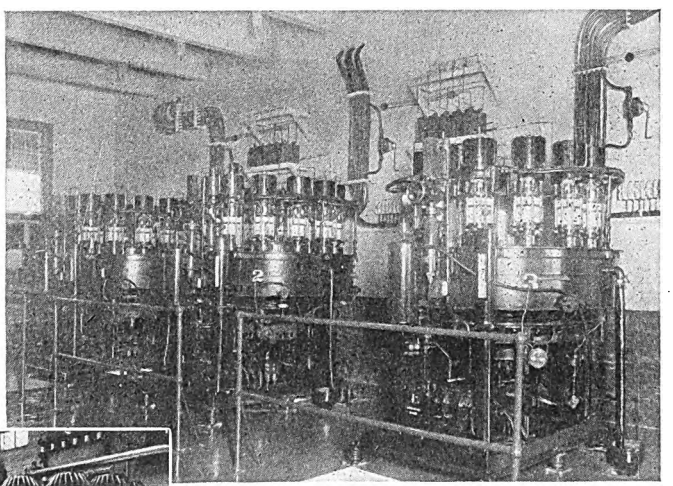
By

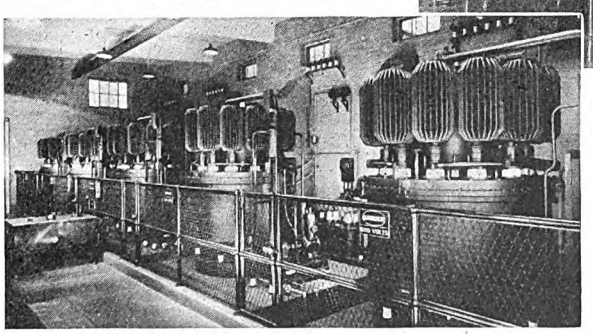
L. D. BALE

Superintendent of Power, Cleveland Railway

First Vice-President

American Electric Railway Engineering Association





Mercury arc rectifier substation equipment for 600-volt d.c. service. Above—Installation of the Long Island Railroad at Hempstead. At left—Equipment of the Connecticut Company at Bridgeport

Digitized by Google

likewise new ideas, aesthetic in their nature, regarding the surroundings of the building. The substation building no longer takes the form of conventional factory structure for in some instances where stations have been located in suburban residential areas it would be difficult for the uninformed to distinguish the substation building from neighboring residences. By these means, the engineer has been able to realize upon the advantages offered by the automatic plant and obtain a source of power supply in territories where heretofore it was necessary to absorb the heavy power losses and annual charges due to long distribution cable or suffer low operating voltage with its adverse effect upon car schedules.

In applying the automatic substation, particularly to the metropolitan field, the necessary feeder calculations are considerably more extensive and exacting than was generally the case with the larger capacity manually operated plants. The smaller capacity of the automatic plant and the relatively confined area which it is intended to feed makes it necessary to work within closer limits than formerly. The problem of reserve capacity is no longer solved by installing spare equipment in each substation.

Removing old and stringing of new trolley wire in one operation

The close proximity of the power sources permits of a more economical method and insures greater continuity of power supply to the system as a whole. Due to this new arrangement, the distribution system is utilized to make available the capacity of the entire system which may not be in use at any particular moment. To accomplish this result a close adjustment of the ohmic resistance of the feeder system between stations is necessary so as not to unbalance the load between stations.

The supervision of a number of automatic plants in metropolitan service, particularly where they constitute major sources of power, is an essential factor in obtaining the maximum economy and the highest guarantee for continuity of service. Superimposing some form of remote and supervisory control upon the automatic features of the conversion equipment and the outgoing direct current distribution control system, by means of which a dispatcher may at all times be fully acquainted with conditions on the system and in which he has at his disposal means to change conditions instantly whether due to routine operation or emergencies, constitutes without question the greatest insurance for efficient operation and a continuous supply of energy to the cars.

Simultaneously with the development of the automatic substation, the remote and supervisory control system and the new conception of the distribution system, which constitutes one of the greatest contributions the engineer has made to the industry, great strides have been made elsewhere within his jurisdiction. The great improvement in performance of overhead contact and distribution systems, in many instances at a reduced cost per mile, is certainly worthy of comment. Year by year due to intensive study and the research work of the railways and the manufacturers new low records are being established for trolley wire breaks. The stringing of trolley using the dynamometer method, rigid inspection on a car mileage basis rather than at definite periods regardless of car passages, dependable reports and the schooling of employees are chiefly responsible for this marked improvement. The industry is indebted to the several A.E.R.E.A. Power Committees which have made studies and prepared reports upon this and allied subjects. These reports have not only created influence toward standardization, making possible the procuring of better materials, but they also have been the means of placing before the individual engineer a cross section of what the industry as a whole is accomplishing. As a result they have given him new insight and an incentive for additional work.

Since one of the prime factors in the delivery of a continuous supply of power to the car is the contact system, it behooves the engineer to eliminate every trolley break possible from whatever cause. In this connection it has been noted, in perusing the reports of various railways, that there is more or less of a universal increase in the number of trolley breaks under the so-called uncontrollable classifications. These are due to pull-downs or burn-downs by railway equipment, in most instances improperly operated, or by objects of unusual dimensions being transported through the city streets.

Much favorable public reaction may be occasioned by the co-operative installation or use of some form of ornamental pole for the support of overhead structures, particularly if the channels are available whereby the public can be made to realize that the railway, by such acts, is interested in contributing to the civic improvement of the community. There have been several installations within the past two years where railway poles, street lighting standards and traffic signal standards or poles have been replaced by the use of one structure resulting in a greatly improved appearance of the thoroughfares.

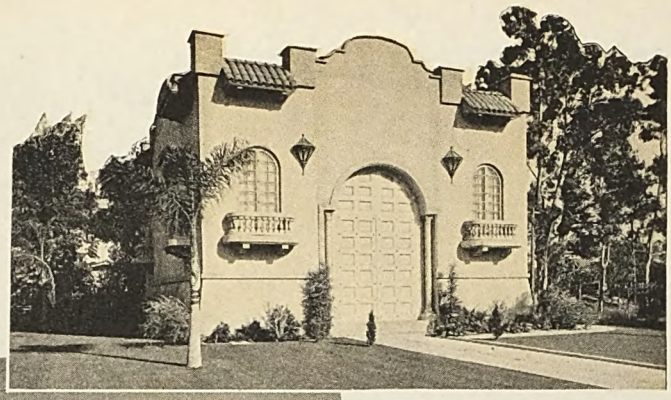
Digitized by Google

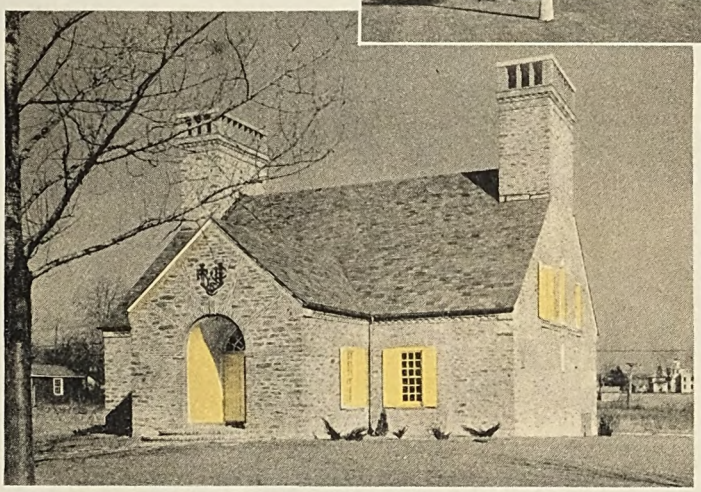
Profitable results may be obtained by instigating a survey of the distribution system to ascertain its efficiency. This investigation, which involves the distribution plant from the power sources to the cars and includes both positive and negative sides of the circuit, is, of course, considerably simplified if the cars are equipped with power measuring devices. Quite aside from the possibility of advantageous readjustment of parts of the distribution system, based upon the results of such a survey, it will indicate the difference between the total amount of power drawn from the bus bars of the system power sources and that actually used in the production of revenue car-miles. It is safe to say that the engineer who has not taken the occasion to make such a survey will be astonished at the amount of energy used on his system for miscellaneous purposes.

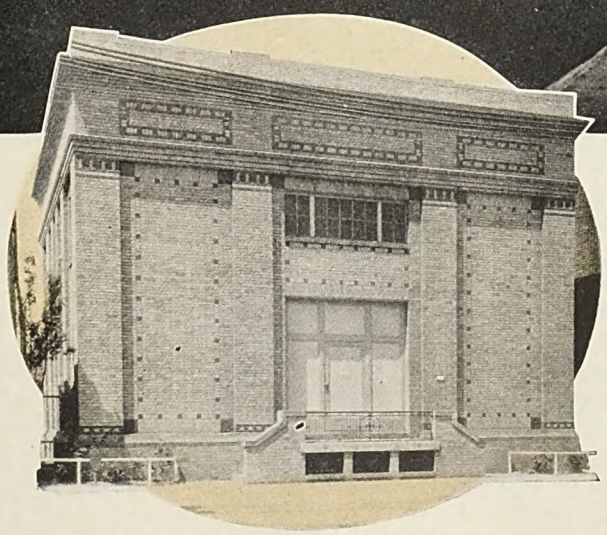
One important item of electric railway maintenance, which is too often neglected, is rail joint conductivity and the method of determining electrical resistance of rail joints. The electrical conductivity of the track joints not only has an important bearing upon the efficiency of the distribution system but also involves the relationship of the railway with other public utility companies utilizing the city streets as well as the individual property owners and patrons of the company.

The foregoing includes but a few of the important factors by which an economical and continuous supply of energy may be assured and where other functions of the power department may be conducted in such a manner that the railway and the public are best served. These factors, in the majority of cases, constitute two of the three conditions or requirements mentioned previously.

The third factor must be accomplished through the cooperative effort of the entire personnel. Employees in contact with the public must be schooled in order that proper conduct will be assured. Proper means also must be established, maintained and controlled, whereby the public is kept constantly advised of the company's steps to insure safe, speedy and dependable transportation at lowest possible cost.



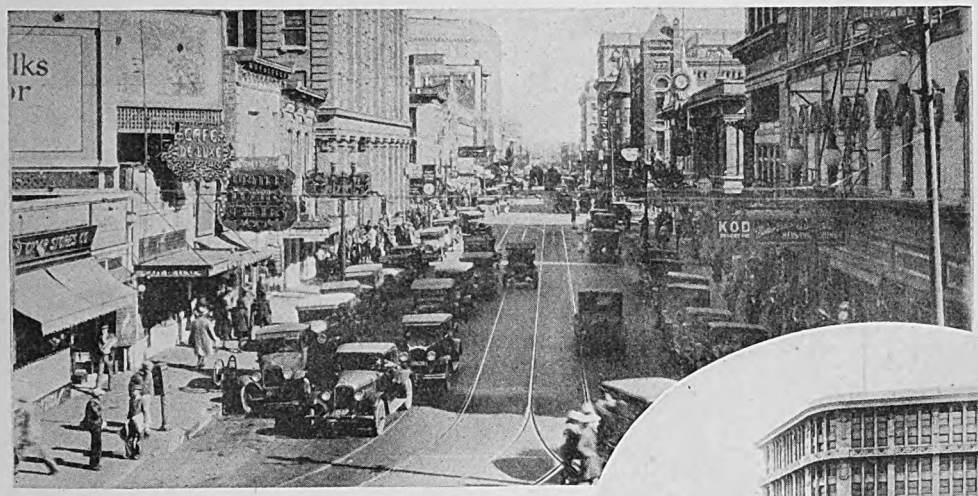




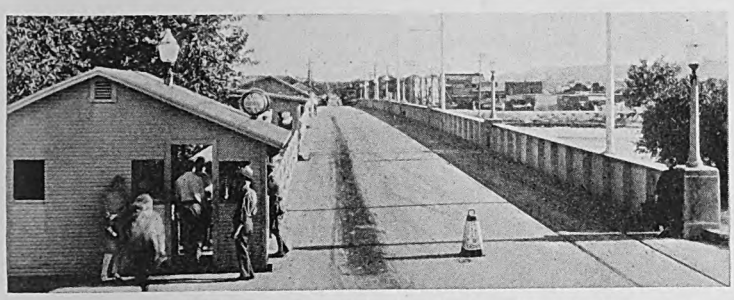
Examples of modern substation buildings, designed to harmonize with the particular territory in which they are located. From top to bottom—substations in Los Angeles, Baltimore, Atlanta and Cleveland

Digitized by Google

Digitized by Google

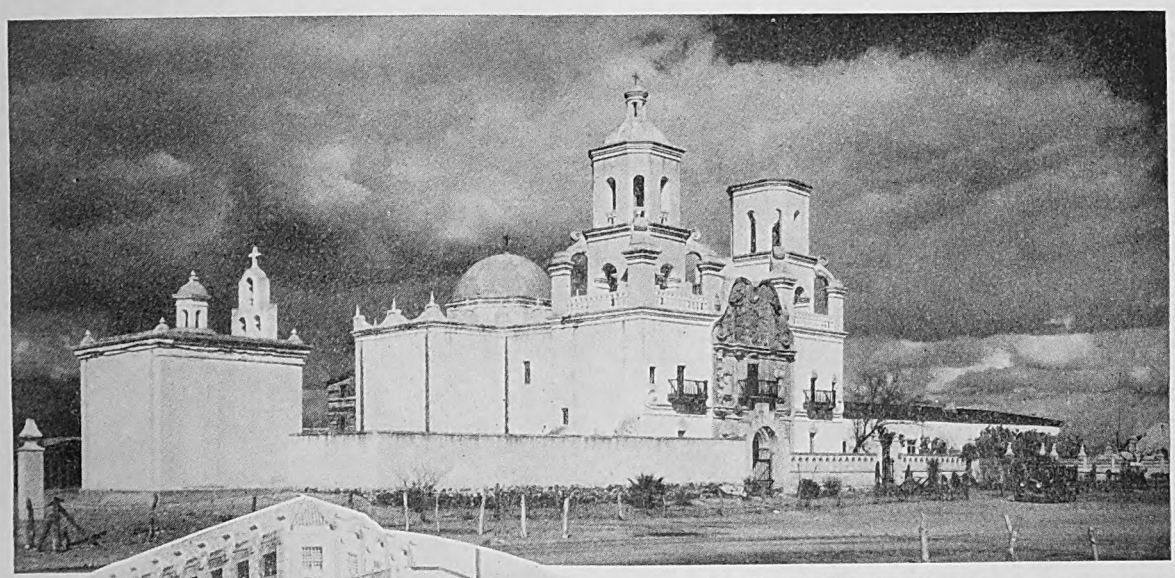


San Antonio St., a heavily-traveled artery in the business district of El Paso



One of the bridges over which the El Paso Electric Company operates cars to Juarez, Mexico

The "heart" of El Paso—San Jacinto Plaza



San Xavier Mission, Tucson, the oldest mission in this country

Buses of the Phoenix Street Railway Department in front of the City and County Building

WITH the great number of automobiles in use now the electric railways must make their track, equipment and service approach that of the private vehicles if they expect the public to ride the cars. Our experience indicates that neat, comfortable and speedy cars, operated on a smooth roadbed, offer a real inducement to prospective patrons. Following the rehabilitation of our system, involving the reconstruction of our worn-out track and the replacement of our antiquated cars with new vehicles, revenues increased from 25 to 60 per cent.

C. E. NEWCOMER

Superintendent Phoenix Street Railway Dept. Phoenix, Ariz.

Digitized by Google

The mill room, located directly behind the body repair tracks. This arrangement was adopted for all the departments

MODERN MACHINERY

A Sound Investment for

Better Maintenance

By

E. J. JONAS

Superintendent of Equipment
Cincinnati Street Railway
Cincinnati, Ohio

EXPERIENCE has proved that most car equipment of the conventional design can be made reliable and reasonably quiet in operation by efficient inspection and maintenance standards, the price of which is good tools plus eternal vigilance. With these two allies many electric railway properties have made real progress in keeping their cars in better condition at a lower cost. Great reductions in number of pull-ins and increases in mileage without mechanical difficulties serve as the tangible proofs for many systems of this program.

Well-arranged shops and carhouses, furnished with modern machinery and equipment, have played an extremely important part in improving the quality of work and, more particularly, in reducing costs. Adequate maintenance facilities and the provision of the proper machines for doing the many types of work are being considered essential by more and more companies. They realize the opportunities for savings in labor and equipment and that the resulting economy makes the additional or improved facilities a good investment.

A little more than two years ago the Cincinnati Street Railway completed its Winton Shop and transferred its operations from the old Chester Park Shops. Much thought was given to obtaining the best possible design and location of the building proper. In line with an efficient building layout, the company provided all the

Digitized by Google

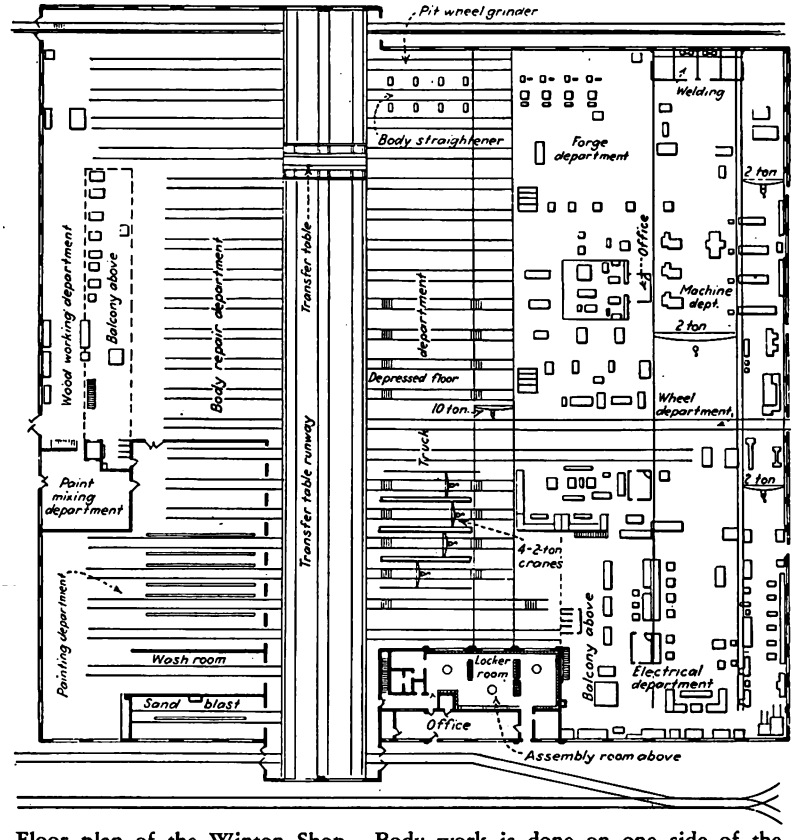
necessary modern machines and equipment for the efficient overhauling and maintenance of its rolling stock.

The steady increase in car-miles per disabled car from an average of 4,500 in December, 1927, to 20,000 in September, 1929, and the gradual decline in maintenance cost per car-mile, show a justification for the investment made in these modern facilities for street car upkeep. Many of the practices in maintenance work made possible by the new shop and its equipment are relatively insignificant in themselves as compared to the whole; many of these accomplishments are more the result of providing workmen with facilities and surroundings that encourage initiative and individual effort rather than the installation of labor-saving machinery.

Idle Workmen or Idle Machines?

In selecting new shop equipment it is advisable to obtain the best possible machine for the work to be performed, bearing in mind that an idle tool is unprofitable. In cases when such a tool will only be used occasionally, it is best to purchase the least expensive. On the other hand, an idle workman is more expensive than an idle machine; therefore, adequate equipment must be available in order that man-hours will not be lost on this account.

In the electrical department of the new Winton Shop the equipment includes five welding sets, two automatic wheel welding heads, two armature baking ovens, an electrically heated cleaning tank, a waste-treating plant and nine grinders of various types. Metal-working machines include ten lathes, a 400-ton car-wheel press, numerous grinders and drills, and other useful equipment. A very complete array of machines is provided in the woodworking department. Other equipment of special interest includes two cleaning ovens, a car-body straightener, an air-valve test bench, a special sand blast, a car spray hood, a combination transfer table and car hoist and a telescoping air jack. In an accompanying table all of the important machines and tools are listed.

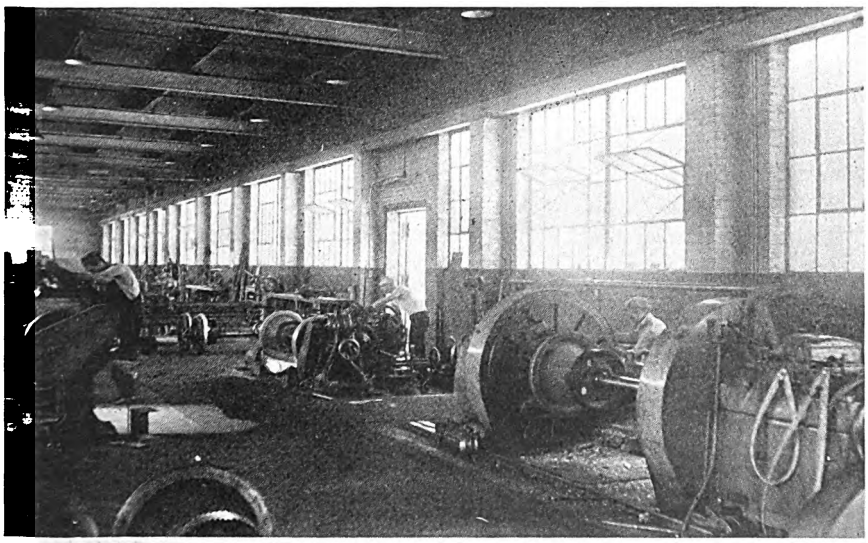


Floor plan of the Winton Shop. Body work is done on one side of the transfer table runway and all truck and electrical work on the other side

A slight modification of the principle of designing a shop so that each track will hold but one car was made to bring about a more harmonious floor plan. In the erecting department four of the tracks are long enough to accommodate two cars. This does not interfere with the general scheme, however, as cars that must remain in the shop for a longer period are placed at the far ends.

The principle of keeping all body work on one side and all truck and electrical work on the other side was recognized in the floor plan. To facilitate the placing of the car body in one department and the trucks in another at the start of the overhaul it was decided to place a car hoist directly on the transfer table, doing away with the necessity of equipping each erecting shop track with an individual hoist. This arrangement has since proved to be ideal for this shop, no confusion or congestion resulting from movement off or on the transfer table. It is provided with a power cable reel for moving cars and trucks with motors and a motor-driven winch for moving equipment not having motive power. The car hoist consists of two 15,000-lb. overhead hoists, each having two drums on one shaft with hooks at the lower ends of cables that permit raising car bodies to a height of 6 ft. This height permits a thorough and final inspection of the body, brake rigging, side and center bearings, and other parts.

No live trolley wires are suspended over repair tracks, since the move-



Section of the wheel department with its array of modern machinery for maintaining and reclaiming wheels

Digitized by Google

ments are very short and can be accomplished by means of cable leads or the power winch and rope.

In locating the various tools and machinery, care was taken to place them so that the parts being overhauled would be moved a minimum distance. The present output of eight overhauled cars per week of 45 working hours is not an adequate indication of the capacity of this shop, since much of the work being done at present consists of rebuilding rather than overhauling.

Provisions for Handling Materials and Parts

Physical exertion is reduced to a minimum in the handling of parts and supplies by means of numerous jib cranes and an electric industrial truck with elevating platform of the high lift type. The shop also is equipped with one 10-ton and nine 2-ton floor-operated traveling cranes.

When motors are removed from trucks they are placed on platforms that permit the lift truck to pick them up without further handling, and are delivered to the motor repair section. Mounted wheels are transported in like manner. Air compressors, controllers and resistors as well as all supplies from the storeroom, are also handled by this truck.

Incoming motors are placed near the cleaning tank where housings and armatures are removed. Housings are placed in the cleaning tank, while armatures are passed down to the winding section for dipping and baking. They are then taken to the bending lathe, and finally are removed to the armature bench near the vertical boring mill and bearing press. By this time cleaned housings have also arrived at this point. The bearings are then checked and new bearings bored to the correct fit if new ones are needed. All armatures and axle bearing housings are kept with their respective motor frames when being reassembled. After motors

Equipment Installed in the Winton Shop of the Cincinnati Street Railway

Electric Equipment

3	Wldg. mtr.-gen. sets—300 amp	Westinghouse Electric & Mfg. Co.
1	Wldg. mtr.-gen. set—175 amp.	Westinghouse Electric & Mfg. Co.
1	Wldg. mtr.-gen. set—400 amp.	General Electric Co.
1	Welding transformer—150 amp.	Gibb Instrument Co.
1	Automatic wheel welding head	Westinghouse Electric & Mfg. Co.
1	Automatic wheel welding head	General Electric Co.
1	Armature baking oven—28 kw.	Westinghouse Electric & Mfg. Co.
1	Armature baking oven—21 kw.	Westinghouse Electric & Mfg. Co.
2	Babbitt pots—300 lb	General Electric Co.
1	H. L. control test set	Westinghouse Electric & Mfg. Co.
1	Battery charger—50 amp.	Electric Products Co.
1	Electric high-lift truck	Elwell-Parker Electric Co.
1	Elec'cally-heated cleaning tank	*
1	Waste-treating plant	*
1	Lumber-heating oven	*
1	Snagging grinder	Cincinnati Electric Tool Co.
4	Dry grinders—12 in.	Cincinnati Electric Tool Co.
1	Dry grinder— 8 in.	United States Electrical Tool Co.
1	Tool grinder—12 in.	Cincinnati Electric Tool Co.
2	Dry grinders— 6 in.	Cincinnati Electric Tool Co.
1	Buffing lathe	Hisey-Wolf Manufacturing Co.
1	Band saw brazer	Oliver Machinery Co.

Forge Shop Equipment

1	Air hammer—800 lb	Nazel Engineering & Machine Works
1	Blacksmith's helper	Blacker Engineering Co.
1	Forging furnace	Strong, Carlisle & Hammond Co.
1	Shoe bolt forging machine	*
1	Shoe bolt forging furnace	*
4	Down draft forges with blowers	Buffalo Forge Co.
3	Surface plates	*
4	Iron storage racks	*

Metal Working Machine Tools

1	Engine lathe—16 in. x 8 ft.	American Tool Works
1	Engine lathe—20 in. x 8 ft.	American Tool Works
1	Engine lathe—24 in. x 10 ft.	American Tool Works
1	Engine lathe—25 in. x 12 ft.	R. K. LeBlond Machine Tool Co.
2	Engine lathes—24 in. x 10 ft.	R. K. LeBlond Machine Tool Co.
1	Toolroom lathe—12 in. x 8 ft.	Lodge & Shipley Machine Tool Co.
1	Turret lathe, flat turret	Acme Machine Tool Co.
1	Turret lathe, semi-automatic	Acme Machine Tool Co.
1	Car wheel lathe	Niles Tool Works
1	Car wheel press—400 tons	Niles Tool Works
1	Car wheel grinder	Springfield Manufacturing Co.
1	Axle grinder—18 in. x 8 ft.	Norton Co.
1	Car wheel borer—48 in.	Niles Tool Works
1	Vertical boring mill—34 in.	King Machine Tool Co.
1	Horizontal boring mill—32 in.	Lucas Machine Tool Co.
1	Milling machine—No. 4	Cincinnati Milling Machine Co.
1	Shaper—32 in.	Smith & Mills Co.
1	Shaper—16 in.	Smith & Mills Co.
1	Radial drill—5 ft.	Cincinnati Bickford Tool Co.
1	Radial drill—4 ft.	Dreses Machine Tool Co.
1	Planer—42 in. x 42 in. x 16 ft.	Cincinnati Planer Co.
1	2-Spindle drill	Fosdick Machine Tool Co.
2	Sensitive drills	United States Machine Tool Co.
1	Sensitive drill	Canedy-Otto Mfg. Co.
1	Punch press—No. 21	E. W. Bliss Co.
2	Upright drills—24 in.	Cincinnati Bickford Tool Co.
1	Upright drill—21 in.	Cincinnati Bickford Tool Co.
1	Squaring shear—5 ft.	Bertsch & Co.
1	Bolt cutter—2 in.	Acme Machinery Co.
1	Bolt cutter—2 in.	Landis Machine Co.
1	Universal shaping saw	Peerless Machine Co.
1	Hack saw	Peerless Machine Co.
1	Cutter grinder	Oesterlein Machine Co.
1	Drill pointer	Oliver Instrument Co.
1	Toolroom upright drill	Fosdick Machine Tool Co.
1	Straightening roll	Bertsch & Co.
1	Portable pipe threading machine	Robbins & Campbell Co.
1	Centering machine	E. W. Whiton Machine Co.
1	Nibbler shear	W. J. Savage Co.

Woodworking Machine Tools

2	Band saws—42 in.	J. A. Fay & Egan Co.
1	Swing saw	J. A. Fay & Egan Co.
1	Planer—No. 2	J. A. Fay & Egan Co.
1	Mortiser	J. A. Fay & Egan Co.
1	Shaper	J. A. Fay & Egan Co.
1	Universal wood worker	J. A. Fay & Egan Co.
1	Rip and cut-off saw	J. A. Fay & Egan Co.
1	Roll sander	J. A. Fay & Egan Co.
1	Tenoner	J. A. Fay & Egan Co.
1	Knife grinder	J. A. Fay & Egan Co.
1	Band saw filer	Black Diamond Saw & Machine Co.
1	Post drill	Champion Blower & Forge Co.

Hand-Operated Tools

1	Hand punch	*
1	Slitting shear	Excelsior Tool & Machine Co.
1	Punch press	Standard Machinery Co.
1	Folder	Peck, Stow & Wilcox Co.
1	Slip roll former	Peck, Stow & Wilcox Co.
1	Pipe bender—2 in.	American Pipe Bending Machine Co.
1	Arbor press—No. 4	Atlas Press Co.
1	Arbor press—No. 0	Atlas Press Co.
1	Brake—10 ft.	Dreis & Krump Mfg. Co.
1	Hydraulic axle straightener	*
1	Hydraulic armature press	*
1	Axle test stand	*
1	Paper shear	Excelsior Tool & Machine Co.
1	Shear	*
2	Hand lift trucks	Steubing-Cowan Co.

General Equipment

1	Gear pan cleaning oven	*
1	Axle bearing cleaning oven	*
1	Car body straightener	*
1	Toolroom furnace	Bellevue Industrial Furnace Co.
1	Air valve test bench	*
2	Banding lathes	Columbia Mach. Wks. & Mall. Iron Co.
1	Armature dipping plant	*
1	Field winder	*
1	Air compressor—350 cu.ft.	Worthington Pump & Machine Co.
1	Sand blast equipment	W. M. Sly Mfg. Co.
1	Sand blast ventilating equipm't	Young & Bertke Co.
1	Sash washing tank	*
1	Car spray hood	DeVilbiss Co.
1	Sign spray hood	DeVilbiss Co.
1	Waste wringer	American Laundry Machine Co.
1	Mill exhaust blower	American Blower Corp.
1	Mill exhaust system	Young & Bertke Co.
1	Sewing machine	Singer Sewing Machine Co.
2	Car body turners	*
1	Electric drill stand	Cincinnati Electrical Tool Co.
1	Forcing press—30 ton	Lucas Machine Tool Co.
1	Transfer table and car hoist	*
2	Electric elevators	Warner Elevator Co.
1	Hydraulic elevator	Warner Elevator Co.
1	Traveling crane—10 ton	Niles Tool Works
8	Traveling cranes—2 ton	Chisholm-Moore Mfg. Co.
1	Chain hoist traveling crane	Chisholm-Moore Mfg. Co.
1	Telescoping air jack	*
1	Water heater	Bryant Heater & Mfg. Co.
46	Unit heaters for shop heating	American Blower Co.
1	Blue print machine	Wickes Bros.
1	Sand drying plant	C. O. Bartlett & Snow Co.
2	Boilers—250 hp.	Tudor Boiler Mfg. Co.
2	Stokers	Riley Stoker Corp.
5	Wash basins	Bradley Wash Fountain Co.
186	Lockers	All-Steel Equipment Co.
20	Jib cranes, with Ford chain hoists and trolleys	*
	Office furniture	Globe Wernicke Service Co.
	Fire extinguishers	Knight & Thomas, Inc.
	Pwr. transf'rs and switch b'rd.	General Electric Co.
	Shop motors and control	Westinghouse Electric & Mfg. Co.

*Designed and built by the Cincinnati Street Railway.

Digitized by Google

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Alliance, Ohio—Approximately $40,000 is being expended by the Stark Electric Railroad this summer for rehabilitation. The company operates between Canton and Salem, a distance of 30 miles. Fifteen thousand new ties are being placed and several grade crossings are being rebuilt.

✦

Philadelphia, Pa.—The Philadelphia Rapid Transit Company has purchased the Hartel Cab Company, operators of about 25 cabs from the Sixty-ninth Street Terminal here and in Lansdowne. Yellow cabs will replace those formerly owned by the Hartel Company.

✦

Chicago, Ill.—Union employees of the Chicago Surface Lines have signed a new wage and working agreement with the company. The terms include renewal of the wage scale which has been in effect for the last three years. The renewal is for one year from May 31.

✦

Lawrence, Mass. — The Eastern Massachusetts Street Railway made its fourth installation of the weekly pass at Lawrence on May 18. The pass sells for $1.25 against a cash fare of 10 cents and ticket rates of fourteen for $1, and Belt Line rate of six for 50 cents. The Brockton division added a pass Nov. 3, 1929; Lowell, Dec. 29, 1929, and Haverhill, Jan. 24, 1930.

✦

Seattle, Wash. — Agitation for construction of a loop to replace the wye at the north end of the Phinney-Greenwood Municipal car line, North 85th Street and Greenwood Avenue, is being revived. Building of the loop would require the purchase of private property for right-of-way as Phinney Avenue is not cut through in this area. The purchase and the loop construction would cost about $30,000.

✦

St. Louis, Mo.—The General Taxicab Company ceased operations at 4:30 p.m. on June 9 because it was unable to meet the demands of the Chauffeurs Union for payment in full of wages due the 125 chauffeurs normally employed, or post a cash guarantee that the wages would be paid. The company has been holding back five days wages of employees in making up its payrolls. It has been named defendant in bankruptcy proceedings. Forty-four of the company's 66 cabs were in operation on June 9.

✦

Los Angeles, Cal.—The Pacific Electric Railway has applied to the Railroad Commission for authority to issue two notes of the face amount of $311,846 each, to Motor Transit Terminal Corporation, in part payment of the purchase of capital stock of Motor Transit Company, operating an extensive auto stage service in southern California. The notes are to be dated Jan. 1, 1930, and one is to be payable July 1, 1931, and the other on Dec. 31, 1931.

(Late News Continued on Page 424)

Auto Does Not Justify Its Use of St. Louis Streets

Merchants Misguided About the Value to Them of Customers Who Come to Stores in Their Own Cars—Five Times as Many Carried by Street Car as by Auto

TO DETERMINE accurately the character of traffic in the business district of St. Louis, Mo., the St. Louis Public Service Company on May 26 sent 170 checkers into the district bounded by Twelfth Boulevard, Market Street, Third Street and Washington Avenue, to note the kinds of traffic in that section and the volume of such traffic.

Among other things the company wanted to know what part private automobiles play in transportation and whether parked automobiles carry a sufficient number of persons to justify their private-garage use of much-needed street space on the badly congested downtown thoroughfares.

The checkers found that 45,961 automobiles entered the district during twelve hours and carried 72,342 persons, an average of only 1.58 persons per automobile, including the driver. It was found also that 14,693 of these automobiles parked at the curb during some time of the day. Thus it was found that the parking of these private automobiles in the 56 square blocks comprising the congested area accommodates only 23,222 persons. That number was only 10 per cent of the persons who entered the district during the twelve-hour period under observation. In short, 10 per cent of the persons entering the district monopolized about one-third of the downtown street space for the storage of their automobiles. The average parking time of automobiles ranged from 45 minutes on Sixth Street to 1 hour and 40 minutes on Market Street.

In the twelve-hour period, 216,350 persons entered the downtown district and of these the street cars and buses carried 129,819 or 60 per cent. During the rush hours 7 a.m. to 9 a.m., the street cars and buses carried 73.5 per cent of all and the street cars alone 65 per cent. The average street car load was 28.5 persons. The buses carried 15,277 persons into the district and with 693 buses entering the average was 22 persons per bus. Service cars, or jitneys carried 6,528 persons in 1,629 cars or only four persons per vehicle.

The 1,221 street cars and buses entering the district carried four times as many people as the 14,532 private automobiles. The elimination of all parking in the downtown district would save five minutes to street car riders in getting into and out of the congested district. Some downtown business men have been reluctant to advocate the abolition of parking, even on very narrow streets. The traffic check made by the railway dispels the theory that parked automobiles are an aid to retail business downtown.

Checkers, who studied the customers of the city's four large department stores during the day, found the total in excess of 120,000 or about five times the total number carried into the district by all the private automobiles. Few persons who use the downtown streets for private garages are potential customers of the stores in the districts. Most of them are employees of various establishments.

Illumination a Feature

AS an added entertainment feature of the American Electric Railway Association Convention at San Francisco, the local committee of the National Electric Light Association will hold over from the convention of that association the special illumination features in the Civic Center so it will be available for display on Monday evening, June 23, following the A.E.R.A. banquet.

Engineers Report on Transit in Philadelphia

J. A. Emery, chairman, Milo R. Maltbie, W. K. Myers and S. M. Swaab, constituting the transit advisory committee to the general conference on the transit situation in Philadelphia, filed their report on May 24. The document covers 151 pages of typewritten text together with 71 tables. The report deals with the principal facts of the transit situation. The members of the committee do not recommend any specific plans for improvements, nor do they attempt to determine what is preferable, believing their action in this respect to follow the purport of the instructions under which they proceeded.

In the discussion of the various plans they illustrated the financial results under certain assumed conditions. They say that no one can predict what terms might be agreed upon between the city and other parties at interest under any one of these plans without knowing specifically the terms and conditions.

In their discussion they used the financial data reported by the Philadelphia Rapid Transit Company for the year 1929, but did not attempt to analyze, audit, or review the data as such criticism would involve among other things the determination of questions at issue in a judicial proceeding and were considered beyond the scope of the inquiry which the members were instructed to conduct. The members of the committee say that it is impossible at this time to make a satisfactory forecast of earnings of the property largely because of changing economic conditions.

Digitized by Google

Conway Interests Take Philadelphia & Western Railway

Thomas Conway, Jr., and his associates have assumed control of the Philadelphia & Western Railway and will actively direct the management. The company operates a high-speed suburban system running from the 69th Street Terminal, Philadelphia, to Strafford and Norristown, respectively, passing en route through Ardmore, Haverford, Bryn Mawr, Villa Nova, Radnor, and other communities.

For the purpose of insuring continuity of management and policies, the holders of a majority of the total number of outstanding shares of capital stock of Philadelphia & Western are depositing them under a voting trust agreement extending over a period of years under which Thomas Conway, Jr., William L. Butler, Alba B. Johnson, Edgar C. Felton and C. Jared Ingersoll are named as voting trustees. Mr. Conway has been elected chairman and Mr. Butler vice-chairman of the board. They will be the senior executive officers of the company. No changes in the operating personnel are contemplated. John L. Adams will remain as president, reporting to the chairman and the vice-chairman of the board. Mr. Johnson has been associated with the Conway interests in other electric railway properties.

The plan also contemplates that a large block of stock in the Philadelphia & Western will be acquired by the Conway interests.

In 1922, Mr. Conway and his associates took over the management of the Chicago, Aurora & Elgin Railroad, a high-speed suburban system serving the western suburbs of Chicago. During a period of approximately four years of operation of this property by the Conway interests, gross revenues from railway operation were increased 66 per cent, and net earnings, after operating expenses, maintenance and taxes, more than 150 per cent. In 1926, the control of this company was sold to the Insull interests.

Early in 1926 the Conway interests acquired control of the Cincinnati, Hamilton & Dayton Railway and since that time total operating revenues have been increased 22 per cent and net earnings more than 230 per cent. On Jan. 1, 1930, four other electric railway properties were acquired and the name of the company changed to Cincinnati & Lake Erie Railroad, now one of the largest interurban railway systems in the United States.

The Conway interests, through the Thomas Conway, Jr., Corporation, are the developers of Drexel Park, one of Philadelphia's most beautiful suburbs.

Segregation of Ohio Light and Railway Properties

Stockholders of the Pennsylvania-Ohio Power & Light Company, Northern Ohio Power & Light Company, the Ohio Edison Company, the Akron Steam Heating Company, and the London Light & Power Company, all operating in Ohio and owned by the Commonwealth & Southern Corporation, have been informed that the directors of these companies are of the opinion that to consolidate them, thus uniting the electric light, power and steam heating business into one company and to separate the transportation portion of their properties into subsidiary units, will result in increased efficiency and economy of operation and create an electric company with a greater diversity of consumer use than is now possessed by any one of the individual companies. Accordingly a new company will be formed to be known as the Ohio Edison Company, which will also acquire the physical assets of Ohio River Edison Company and the Ohio River Transmission Company, which companies own the power plant and transmission lines now leased to the Pennsylvania-Ohio Power & Light Company. It is also proposed to convey the transportation portion of the the property of these companies to three separate companies, retaining the consolidated company's equity in them through stock ownership.

Milwaukee Rate Case Under Way

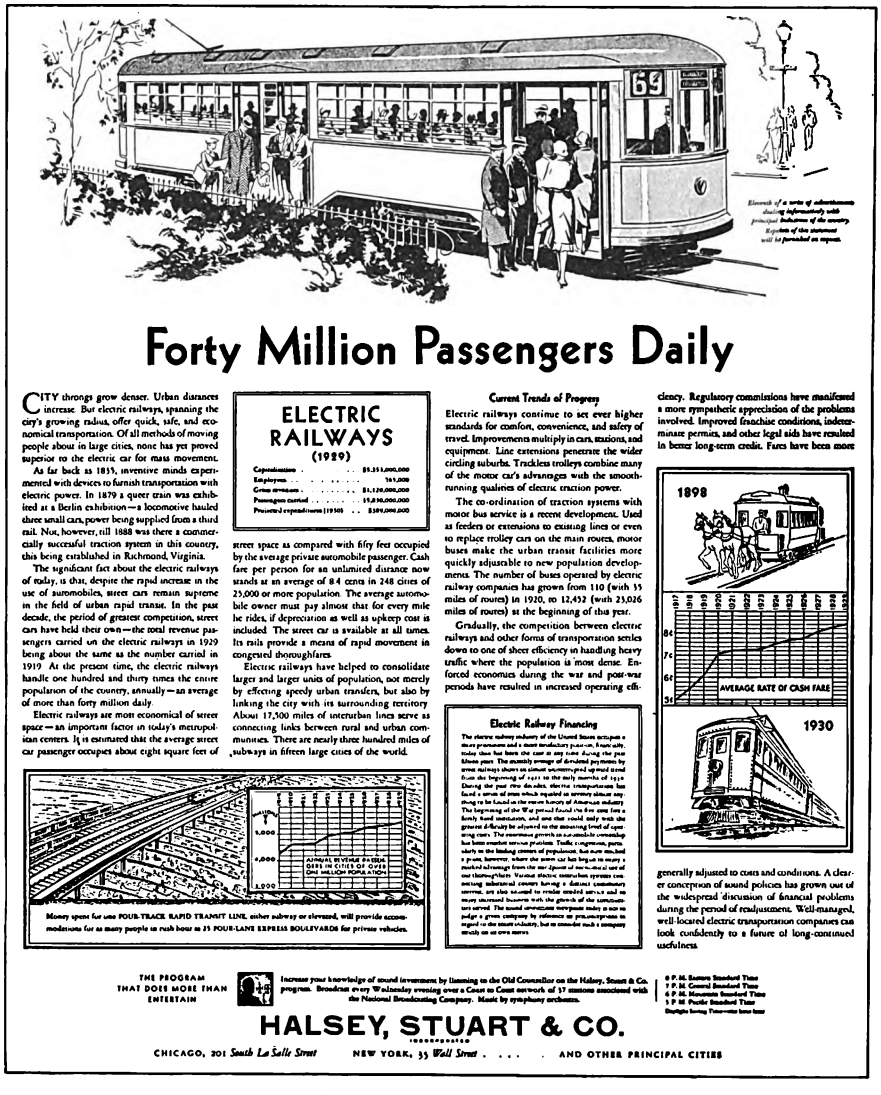
The suburbs of Milwaukee were authorized to intervene in the appeals of the city and the Milwaukee Electric Railway & Light Company from the Railroad Commission's recent street car rate order by Circuit Judge Zimmerman on June 9, at a hearing for preliminary motions in the case at Madison. Trial of the appeals was set for June 18.

Judge Zimmerman also granted the company's plea that its appeal and that of the city be consolidated for puropses of trial. City Attorney Niven said he would not oppose consolidation of the cases if it was understood that the cases were to be presented separately at the same trial.

Nine suburban communities were represented at the trial. The city and the company are appealing from the commission's order as inequitable. The commission, which will be defendant at the trial, was represented by the assistant attorney general at the first trial. The suburbs and other outlying districts, which stand to gain from the commission's order, are intervening to defend the order.

Effective Banker Co-operation

Co-operation from an unusual source in the campaign of the electric railway industry to impress the public with the importance and value of the electric railways is reflected in the accompanying advertisement which appeared over the signature of Halsey, Stuart & Company in the *United States Daily* on May 28, 1930. This advertisement is one of a series dealing informatively with the principal industries of the country. The purpose back of the advertisement was to have it serve as an effective reminder of the important place which the electric railways play in the present transportation system.



Display Ad Emphasizing Importance of the Electric Railways

Digitized by Google

LATE NEWS

(*Continued from Page 422*)

Cleveland, Ohio — The department store for which the Van Sweringen interests made provision in their Cleveland Union Terminal group will be occupied by the Higbee Company, in business 70 years. The store will be built at the intersection of Ontario Street and the south roadway of the Public Square, above the rapid transit tracks and terminal. Construction contracts are to be let immediately.

✦

Utica, N. Y.—Segregation of earnings of the various units of the New York State Railways as urged by holders of mortgage bonds covering the Syracuse and Rochester units and opposed by holders of bonds on the Utica lines, is under consideration by Judge Bryant of the United States Court.

✦

Tacoma, Wash. — Representatives of Titlow Beach and the far west end of the city have thus far failed to convince Tacoma Railway & Power Company officials that there is enough business out Sixth Avenue beyond Proctor Street to warrant the company putting in a bus service at regular city fares. Commissioner Davisson suggested that the company institute a 90-day trial of the bus line.

✦

Davenport, Iowa—Dissolution of the Tri-City Railway & Light Company of Davenport, Iowa; Rock Island and Moline, Ill., to simplify the financial structure of the United Light & Power Company will be voted upon June 19 at a special meeting of stockholders. Direct control will be placed with the United Light & Power Company by the elimination.

✦

San Francisco, Cal.—Officials of the Southern Pacific Company have announced that hereafter special permits will be issued to blind persons accompanied by "seeing eye" dogs giving them the right to use any of its trains carrying coaches, in club cars of Pullman trains, on the upper deck of ferry steamers and on electric trains.

✦

Concord, N. H. — Robert J. Dunn, who operates a bus company under the name of the Yellow Cab Company here, has been authorized to operate a line between Concord and London, N. H., via the Concord airport. At the Public Service Commission hearing on the matter, the petition was opposed by the Boston & Maine Transportation Company and the Concord Street Railway. The latter's rights are protected in the decision of the commission by a clause that forbids the Yellow Cab Company to take on passengers on any streets where the railway holds franchise rights.

✦

Nashville, Tenn. — Hiram A. Davis, superintendent of the railway department of the Nashville Railway & Light Company, is dead.

✦

New York, N. Y.—In a letter to President Hedley of the Interborough Rapid Transit Company, the Transit Commission has declined to hold a hearing on its proposal to issue $40,000,000 additional first and refunding bonds to finance purchase of additional cars ordered by the commission on April 30. The commission holds the company should amend the petition to conform with the commission's wishes.

✦

New York, N. Y.—More than 85 per cent of the replies received by the Interborough Rapid Transit Company in its poll of passengers on the Sixth Avenue "L" favor retaining this line until it is replaced by a subway on Sixth Avenue, according to a summary made public by the company. In answer to the question, "Do you want the Sixth Avenue 'L' kept in operation until the proposed city subway under Sixth Avenue is in operation?" the following replies have been tabulated: Yes, 12,136; no, 2,085.

✦

St. Louis, Mo.—The Missouri Public Service Commission has approved the plan for the St. Louis Public Service Company and the Peoples' Motor Bus Company to interchange transfers for the convenience of patrons of the St. Louis Municipal Opera, which opened a twelve-week season at the Open Air Theatre in Forest Park on May 30.

✦

New York, N. Y.—Supreme Court Justice Levy has granted the city's application for removal of Interborough Rapid Transit Company's elevated spur in East 34th Street. At present, one-car shuttle train, carrying an average of 140 passengers a day is operated over line.

✦

East St. Louis, Ill.—The City Council has adopted a resolution opposing the application of the East St. Louis Railway for a straight 10-cent fare for adults. Cash fares now are 10 cents but five tokens are sold for 40 cents.

✦

Louisville, Ky.—Director of Works Will has approved the application of the Louisville Railway to abandon the Brook and West Main line, the Bank Street line and the Jefferson Street line west of Seventh Street. Mr. Will has also approved the rerouting of the Portland Street line, the inauguration of a bus route in Portland and a rerouting of the Preston and Main Street line. The changes will be put into effect within 60 days.

✦

St. Augustine, Fla.—Authority has been granted the city of St. Augustine and the St. Augustine Company, controlled by the Florida Power & Light Company, for abandonment of the railway here in an order issued by the Railroad Commission. The line runs from just east on the Matanzas River bridge across Anastasia Island for a distance of 4.8 miles. The commission said its right was not "exclusive and complete," but that it would be for the best interest of the applicants and the public.

✦

St. Louis, Mo.—The St. Louis Public Service Company has been requested to substitute iron for wooden trolley poles from Olive Street between Twelfth Boulevard and Channing Avenue. A recent experiment of suspending trolley wires from the concrete light standards on Olive Street just west of Twelfth Boulevard indicated that these poles were not sufficiently strong to sustain the additional weight.

Brooklyn, N. Y.—The valuation basis to be used in fixing the price to be paid by New York City for elevated lines of the Brooklyn-Manhattan Transit Corporation continues to be one of the main stumbling blocks in the way of unifying the company's rapid transit lines with the city's new subway system, it developed at a conference of city and state transit officials.

✦

Milwaukee, Wis. — Latest appraisals of the estate of John I. Beggs, long president of the Milwaukee Electric Railway & Light Company, place its value at $54,800,000.

✦

Anderson, Ind.—Receivership proceedings of the Union Traction Company were advanced in Madison County Circuit Court on June 6 when Judge Carl F. Morrow entered a decree with an order to the receiver to sell all property of the company at auction here on July 2. Through deals made direct with bondholders, the Insull interests in the last year have a contract to buy more than 60 per cent of the outstanding bonds of the Union Traction system, and with these in their possession will be in an advantageous position as prospective purchasers.

✦

Chicago, Ill.—First prize in the electric railway posters and cards division competition of the Public Utilities Advertising Association was won by the Chicago Rapid Transit Company.

✦

Manchester, N. H.—The Manchester Street Railway, now being operated by the Public Service Company of New Hampshire, celebrated the 35th anniversary of the electrification of the road on June 8. Officials of the company and city government leaders rode on a new 44-passenger trolley over the route followed by the first car 35 years ago.

✦

New Haven, Conn.—Employees of the Connecticut Company have agreed to a renewal of the present wage scale for one year from June 1. Operators of cars and buses, shop workers and power house men are included. Recently the men, through their executive committee, asked for an increase and changed working conditions. Following conferences it was decided to vote again with the result that the former scale has been renewed.

✦

New York, N. Y. — Additional testimony has been furnished the Mayor's Taxicab Commission favoring a limit on the number of cabs and an increased fare, by Ernest H. Miller, president of the Parmelee Transportation Company, who urged the adoption of a uniform rate of 25 cents for the first quarter mile and 5 cents for each succeeding quarter. He also urged the number of cabs be limited to 15,000.

✦

Alexandria, Va.—The two Alexandria transportation companies, after succeeding on May 13 in a plea for increased fares to become effective on June 10, withdrew their application for the increase before the State Corporation Commission on June 5. The fare was to have been 8 cents. The communication from the companies stated that a decision had been reached "to give the intrastate rates heretofore existing a further trial, hoping that the operation may be continued without the necessity for any increase."

(*Late News Continued on Page 426*)

Digitized by Google

More Convenient Service by Bus in Schenectady

The Public Service Commission has authorized the Schenectady Railway to operate buses in place of cars on the Rosa Road-Nott Street-Erie Boulevard line and the Crane Street line. The city authorities have consented.

Buses on the Crane Street line will be used on practically the same route over which cars now operate and they will also pass through certain streets not now served by the trolley line. The Rosa Road line will supplement existing trolley lines and serve a section of the city not now conveniently reached by the trolley cars. Transfers are to be exchanged between the trolley cars and the buses.

The bus service on the Crane Street line will provide through service from the Mount Pleasant section to the General Electric Works and an alternate route is provided over the Crane Street line so that special shop trips can be made over a more direct line, thereby saving about twelve minutes over present operation. There will be a ten-minute headway and four buses will be used.

The Rosa Road line will furnish service to residents of that section now required to travel at least two blocks to the Grand Boulevard line. This will afford a more direct and time saving trip between that section and the American Locomotive and the General Electric plants.

City and Railway Differ About Madison Fares

Officers of the Madison Railways and city officials have clashed over the proposal by the city that the company try a $1 weekly pass in the hope of increasing its revenue. The company wants a straight 10-cent cash fare and a fare of 5 cents for school children. The present schedule is 10 cents cash, 16 tokens for $1, three for 25 cents and a 5-cent fare for school children.

At the hearing before the Railroad Commission on June 9 Dudley Montgomery, vice-president and general manager of the company, declared that if a weekly pass were substituted for the sale of tokens the passenger revenues would still further decrease. City Attorney Lewis insisted that the company should at least try the pass. City officials contend that a further increase in fares will tend to drive patronage away. The hearing may not be resumed until July.

Separation of Suburban from Through Traffic

In its great Philadelphia station project, the Pennsylvania Railroad is planning to separate to a very large extent the suburban from the through traffic. The through traffic trains will all be handled at the main station, so constructed as to allow trains to go to or from the East, West, South or North, without reversing direction, as is now required. Suburban trains, serving territory within 30 miles of Philadelphia, west of the Delaware River, will all stop at the main station, but they will then continue on about a mile further to a new underground suburban station which is being specially constructed at Sixteenth Street and the Parkway, close to the long-established downtown business center. An overwhelming proportion of the commuters and frequent riders on these trains will use the underground station, while only a few will get on or off at the main station. Thus, the principle of separation or segregation, as between short distance and long distance travel, will be applied on a larger scale to a great railroad terminal project.

N.E.L.A. Delegates Leave New York

Headed by Matthew S. Sloan, president of the National Electric Light Association, who is also president of the New York Edison and affiliated electric companies, 210 members of the National Electric Light Association left the Pennsylvania station in New York on June 12 on a special train known as the "Blue Special" for the Pacific Coast, where they are scheduled to arrive June 15, the day before the 53rd annual convention of the association will begin.

Buses to Replace Rochester-Buffalo Railway Service

The Public Service Commission has granted the application of the Rochester, Niagara Falls & Buffalo Coach Lines, Inc., for certificates for operation of bus lines between Rochester and Buffalo and between Rochester and Niagara Falls.

The new company was organized in the interests of the Rochester, Lockport & Buffalo Railroad. The trolley operates 54 miles between Rochester and Lockport, running thence over the International tracks to Buffalo, carrying freight and passengers. The coach company is to be financed by the railroad and it will operate four buses at the outset, two between Rochester and Buffalo and two between Rochester and Niagara Falls. This number will be increased as service demands. It was stated at the hearing that due to competition with private automobiles, expense of grade crossing eliminations, signal installations, which it anticipates, together with possible paving costs in villages the railroad can not continue operation, and for that reason it organized the coach company. The company's petition amounts to a gradual substitution of bus service for trolley service between Rochester and Lockport and extension of the bus route from Lockport into Buffalo.

The company's petition to operate between Lockport and Buffalo was opposed by the Western New York Motor Lines, the Buffalo Transit Company and the International Railway. The Western New York line claimed the operation would be in direct competition with its buses between Rochester and Buffalo, but this contention, the commission holds, is not sustained by the facts. The Buffalo Transit Company claimed that there was adequate service between Lockport and Buffalo. The commission finds that the two lines would parallel for about 13 miles between Lockport and Sheridan Drive, but the new company is to be restricted and no passengers are to be carried boarding cars in either city for transportation to or from Lockport or Buffalo. The International Railway said that transportation facilities between Buffalo and Lockport are entirely adequate.

New Diesel Bus Tested

Some 40 bus operators and press representatives including one from ELECTRIC RAILWAY JOURNAL were guests of the Mercedes-Benz Company on June 11 at a demonstration and test of a Diesel-engine powered bus just received from the German factory of the company. The bus was operated on a run of about 30 miles at varying speeds in traffic. Its performance appears to be approximately equal to that of a gasoline bus of equal size and motor rating. Control of the vehicle is through a standard gear set and accelerator pedal. Low-grade fuel oil was used. The exhaust appeared practically clear and odorless.

The power plant consists of a six-cylinder Diesel engine with bore of $3\frac{1}{8}$ in. and stroke of $5\frac{23}{32}$ in. The weight is 1,400 lb. At the maximum speed of 1,650 engine r.p.m., the rating is 72 hp. The fuel is supplied to the cylinders by the usual fuel pump and through injection nozzles, and is fired by the heat generated during compression of the engine. To start, a storage battery operated starting motor of conventional type is used with an electric preheater warming "glow plugs" in the ignition chamber to create the necessary temperature for the initial explosions.

The engine has two blocks of three cylinders each, and the crankshaft is of the seven-bearing type and carries a vibration damper. The rods are of steel of double T section, while the pistons are of aluminum alloy. In the cylinder heads are an inlet and an exhaust valve of the overhead type for each cylinder, the fuel injector nozzle and the pre-combustion chamber. The valve mechanism is driven by push rods and rocker arms from the camshaft through helical gears. The water circulation system in similar to that in general use with gasoline engines for bus service.

It is stated that the engine and vehicle are now in production for sale in the American market. The National Railway Appliance Company of New York is the sales agent for the United States.

Detroit's Trackless Trolley To Be Fittingly Installed

Ceremonies befitting the occasion are planned for the opening by the Department of Street Railways, Detroit, Mich., on June 16 of service by trolley bus over a route of more than 5 miles on Plymouth Road between Grand River Avenue and the city limits. It is expected that Henry Ford will be among the prominent citizens who will attend. The city recently ordered six trackless trolleys from the Twin Coach Corporation.

H. L. Miller in New Post

H. L. Miller, has accepted a position with the Pettibone Mulliken Company as manager of electric railway division. Mr. Miller studied civil engineering at Bucknell University and joined the Engineering Corps of the Pennsylvania Steel Company, Steeton, Pa., on construction and plant maintenance in 1905, entering the frog and switch department of the company in 1907, resigning this latter position in 1910 to accept a position as draftsmen with The Buda Company at Harvey, Ill., with which he served continuously until March of this year. At the time of his resignation he held the position as chief engineer.

Digitized by Google

Trolley Buses for Queens

The Brooklyn & Queens Transit Corporation will ask the Board of Estimate for authority to replace some of its trolleys in the Borough of Queens with trolley buses. Officials of the company, promising closer co-operation with the Queens Highway Bureau, have agreed to aid in the shifting of the tracks on Corona and Way Avenues, Woodhull Street, Flushing Avenue and Metropolitan Avenue.

President Menden said he believed the most feasible plan is to substitute trolley buses for trolleys, so as to permit the removal of tracks from main thoroughfares. This would expedite traffic and would result in lower operating expenses for the company. The company plans to try out the trolley buses on the Junction Avenue route in Corona.

Accident Record Bettered in Kansas City

Four classes of accidents were reduced by the Kansas City Public Service Company, Kansas City, Mo., during 1929. Fell-in-car accidents were lower than they have been for four years. Collision-with-person accidents were reduced to the lowest point in seven years. Car collisions have been lowered more than 50 per cent in the last four years. The blind accident record showed an improvement. Vehicle collisions showed no improvement. Boarding and leaving accidents, and those involving injury by gates and doors, all increased. Two hundred and seventy-seven car and coach operators went through the entire year without an accident that was avoidable. Prizes given by the company are considered largely responsible for improvements in the accident record.

Yellow Coach Reports Best Month in History

General Motors Truck reports Yellow Coach deliveries for May as the largest in the history of the company, deliveries for the month amounting to more than $3,500,000. This sum represents sale of 403 buses, mostly of the large capacity type. The total compares with deliveries valued at $1,535,000 for the corresponding month of last year. Increased sales as reported are due to large orders recently secured from Public Service Co-ordinated Transport, the Greyhound System, Fifth Avenue Coach and other prominent motor coach operators. Coaches ordered and scheduled for delivery in June compare favorably with totals for May.

LATE NEWS

(*Continued from Page 424*)

Chicago, Ill. — The popularity of the service on Diversey Avenue has necessitated an increase in the number of buses originally planned by the Chicago Surface Lines on streets in the northwest section. More buses have been ordered and the installation of service on other streets covered by the order of the Commerce Commission will begin at once. Trolley bus service on Central Avenue, from Lexington Street to Milwaukee Avenue, was started on June 8. The streets, in addition to Diversey and Central Avenues, on which trolley bus service is to be installed are as follows: Narragansett Avenue, North Avenue, Elston Avenue. Belmont Avenue is being supplied with service by means of gasoline buses. Gasoline bus service also will be established on Irving Park Boulevard from Neenah to Harlem Avenue.

✦

New York, N. Y. — The *Financial World* for June 11 is the eighteenth annual public utility review. In addition to an analysis of more than 150 utilities, the issue contains articles entitled: "Forecasting Electrical Growth"; "The Growing Natural Gas Industry"; "Valuing Public Utility Securities"; "Ventures Into Foreign Fields"; "A Study of Utility Holding Companies," and "Analyses of More Than 150 Utilities."

✦

Detroit, Mich.—Recall petitions seeking to remove a mayor from office are being circulated for the first time in Detroit's history. Charles Bowles is the mayor. He was elected last fall to succeed Mayor Lodge on a platform calling for the quick and thorough cleaning up of the city. Now he faces removal on charges that he has permitted Detroit's underworld to ply its illicit trade openly. Another factor in the recall movement was Mayor Bowles' recent dismissal of Frank Couzens, son of Senator Couzens, from the street railway commission in charge of Detroit's municipal railway. The commission, composed of three men, recently voted to increase fares. Mr. Couzens protested vigorously.

✦

Portland, Ore.—Proposal of the Pacific Northwest Public Service Company to extend its 10-cent car zone to nearby points on its three main interurban electric lines and extend full transfer privileges has been discussed by company officials with members of the public service commission. Members of the commission pointed out that Milwaukie residents now riding on the fixed terminals plan will have to pay 10 cents from Milwaukie to First and Alder Streets instead of 7 cents as at present, but the company officials said that under the 10-cent zone plan a Milwaukie resident could ride to any point in Portland for the dime, whereas now, because of the fact that no transfers are granted at this fare, he would have to pay 17 cents.

✦

Greenville, S. C.—The Piedmont & Northern Railway has presented motions in Federal Court here asking that parts of the bill of complaint in the suit of the Interstate Commerce Commission and a group of steam railways against the electric line be stricken out. The commission and steam railways seek to secure an injunction against the $15,000,000 expansion program of the Piedmont & Northern. The case will be tried on its merits in Federal Court during the summer. The Piedmont & Northern is planning immediate resumption of work on the Spartanburg-Gastonia link.

Rockaway, N. Y. — Twenty-two municipally owned buses have been put in operation by the Department of Plant and Structures between Far Rockaway and Neponset, Queens. Soon after municipal operation started the police ordered off the streets all buses of eight non-licensed lines. The present arrangement will continue until satisfactory plans can be outlined for a permanent system. Mayor Walker has indicated that the general report on the bus situation soon to be submitted by the Board of Transportation would clarify the Rockaways problem.

✦

Boston, Mass.—The trustees of Eastern Massachusetts Street Railway took no action on June 10 on the quarterly dividend of $1.25 on adjustment stock due at this time.

✦

New York, N. Y.—The Transit Commission's suit to compel the Interborough Rapid Transit Company to live up to the 5-cent fare requirements of its contract with the city on subway and elevated lines and the company's litigation for a 10-cent fare on its elevated routes will make no further progress until fall. Both suits have yet to reach the Appellate Division calendar and that court is about to adjourn.

✦

Toronto, Ont.—Their names referred back twice without discussion and rejected entirely by the City Council at a special meeting, W. C. McBrien, former Comptroller Albert Hacker and S. J. McMaster, have been renominated by the Board of Control as Toronto Transportation Commissioners. The feeling prevails that some members of Council who voted against the recommended Commission will now change their votes. When the Board of Control met it decided not to name the commissioners, but later reconsidered its decision, and after several fruitless attempts to select other commissioners from names already suggested to it, renominated its rejected selections.

✦

Laconia, N. H. — The Laconia Car Company has voted to pay a liquidating dividend of $10 to preferred stockholders.

✦

Huntington, W. Va.—No further opposition by the city or business interests to rate increases sought by the Ohio Valley Electric Railway is planned upon the showing of the statistician's report civic and business leaders voted favorably on a resolution favoring relief for the railway and voiced their accord with any decision of the Public Service Commission.

✦

Winnipeg, Man.—An early decision regarding the application of the Winnipeg Electric Company for an increase in fares and relief from certain tax imposts, is indicated in the report of the auditors appointed by the City Council to examine the company's books. This report has been presented to the special committee of the City Council. Representatives of the company were present when the report was read to the committee, but a copy was not then available to the company. Despite this, company officials feel that the findings establish the fact that the company is entitled to relief much greater than it asked, and that the report confirms the facts set out in the company's application.

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

Volume 74 | New York, July, 1930 | *Number* 8

The Industry Prepares to Carry Through

OUT of the 49th Annual Convention of the American Electric Railway Association recently held in San Francisco there emerged a very definite feeling that the path of progress for the local transportation industry lies in the direction of scientific study of its problems. At previous conventions there has been an enthusiastic acceptance of the idea of modernization. But progress has been comparatively slow in putting this idea into practice. Though the need for modernization was recognized, uncertainty existed concerning the best way to go about it. No quick and easy solution of the problem was evolved at this year's meeting. Indeed, it was generally recognized that there can be no quick and easy solution. Advances must be made step by step, and a quiet determination to knuckle down and study the situation until satisfactory solutions are found was evident on every hand.

Had the 49th Annual Convention accomplished nothing else than the crystallization of this sentiment, it would go down in history as having been a real success. But it did more. It brought together more closely than ever the electric railway men of the East and the West and the great central area of this country. Though the number of delegates attending the meeting at San Francisco was somewhat smaller than in other recent years, their geographical distribution was more even. A surprisingly large delgation was on hand from the East and also from the Central West. For many it required the expenditure of considerable time and effort to attend the San Francisco meeting, but all felt amply repaid. The attendance of Pacific Coast electric railway men was naturally much larger than when conventions have been held in the East. It is noteworthy, indeed that the total registration was substantially larger this year than at the last previous convention when there were no exhibits. That the 1930 convention should have been so well attended in a year of business uncertainty is an indication of the sincere appreciation which electric railway men have of the value of these annual gatherings.

Path of Progress Outlined by Executives

SELDOM has such a wealth of valuable material been assembled in a convention program as was presented before the American Association at San Francisco. The addresses were well delivered and gave evidence of careful preparation. Beginning with statements of the difficulties confronting the industry by President Shoup and Managing Director Gordon, the speakers discussed ably the various phases of the theme.

Of particular interest were those speakers who saw possibilities of immediate improvement in conditions without sitting idly by and waiting for someone to present a completed program. There is plenty that can be done at once, so that both public relations and physical plant can be improved without the expenditure of large sums of money. The remarks of J. E. Curtis, chairman of the Nebraska Railroad Commission, indicate that regulating bodies in general are willing to go more than half way in working out a program of cooperative effort involving the companies, their employees, and the communities they serve.

Naturally much interest centered in the plan proposed by the President's Conference Committee, which was explained in some detail by Dr. Conway. Undoubtedly this is one of the most important steps ever taken by the association, and its presentation was one of the high spots of the convention.

Good opportunity was afforded at the general luncheon conference held on Thursday, for a summation of the three sessions of the American association. Without a set program, it was possible to obtain a number of viewpoints on the effectiveness of the sessions. It was apparent that executives are prepared to carry through the program outlined by the association. Particularly significant were the confidence shown in the proposed car improvement plan and the general indorsement of it.

Optimism Is in Order

EACH year the electric railway industry is presented with records of accomplishments which challenge the most pronounced skeptics. These records are indicative of progress. Noteworthy improvements in operating conditions and better financial returns are being obtained on small as well as on large properties, and under conditions common to many sections of the country. An active incentive for the presentation of these accomplishments has been the Charles A. Coffin Foundation Award. For the past eight years this award has recognized and rewarded that electric railway which, in the eyes of the judges, has most definitely solved its own problems and contributed valuable guidance for other companies.

This year the award was made to the Youngstown Municipal Railway for its noteworthy achievement in modernizing its service, increasing its earnings and gaining the good will of the public. The record of this company is the more creditable in that it represents continued progress. Only four years ago the Coffin Award was won by the Pennsylvania-Ohio Electric Company, of which organization the Youngstown Municipal Railway is a part.

Among the outstanding accomplishments recorded in this year's presentations are the securing of new and satisfactory franchises which have relieved the companies of

Digitized by Google

many burdens and which will permit operation at a profit; modernization of equipment and plant; efficient co-ordination of street cars and buses; improving standards of construction, operation and maintenance; extension of chartered service and analytical accident prevention activity. These are not temporary measures applied to save or make money in an emergency. They are permanent and of such a nature as to assure further results.

To ignore the fact that the electric railways have traveled a hard and rough road during the past two decades would be futile. Cost of operation has increased materially while fares are practically the same. Many companies are burdened with obsolete franchises, with obligations never contemplated at the time of their making. New capital is hard to find because of an ignorance on the part of the public as to the efficiency and usefulness of the street car. But these obstacles are not insurmountable. Each year the Coffin Award contest shows conclusively that those companies which bend their efforts to the education of the public through careful merchandising and co-operation with local officials are solving these problems successfully.

Car Improvement Receives New Impetus

FOR several years past it has been realized that the key to the problem of the electric railways lies in the design of the car. While there has been general agreement concerning the need for rolling stock modernization, the progress actually made has been comparatively slow. Experiments with various innovations have been made by numerous companies but there has been little co-ordination of effort. Individual railways have insisted on the inclusion of special features in the design of their cars and have refused to incorporate ideas that have been developed on other properties. This insistence upon special design has resulted in keeping up the cost of rolling stock. Improvements in design have not been widely adopted. In fact, the electric car has practically stood still while its chief competitor, the automobile, has become better and cheaper.

To correct these conditions, a definite program has now been undertaken under the auspices of the Presidents' Conference Committee. Investigation convinced the members of this committee that sufficient authoritative information was not available as to the essential features which should be included in the design of the modern electric rail car. As the first step in its program, therefore, the committee has selected C. F. Hirshfeld, research engineer of the Detroit Edison Company, to make a thorough analysis of the needs of the situation and to develop plans for improving design.

It is not the intention of the committee to develop a standard car. Rather it is the intention to try out every worthy idea that is suggested in such a way that duplication of effort among the various electric railways will be minimized, impractical features of design will be eliminated and the best ideas will be promulgated for the benefit of the industry. In this work the committee will have the backing of railways representing more than 60 per cent of the potential car-buying power of the industry and will have also the co-operation of the car builders.

Undoubtedly this is one of the most promising proposals put forward in many years. As a result of this scientific research, it may confidently be expected that design of the electric rail car will be greatly improved. Such an undertaking, however, will require several years for its execution. Meanwhile the industry cannot afford to sit back and wait for the evolution of a perfect car. Already the railways have suffered heavily through the continued operation of obsolete rolling stock. Every effort must be made to replace this obsolete equipment as quickly as possible. Treatment of a critical ailment cannot be deferred in hopes of a more effective remedy being discovered at a future date. The fruits of research will be enjoyed in due time. For the present we must endeavor to take full advantage of the best designs now available.

The Engineer's Responsibility Is Paramount

ORGANIZED research along several lines, which is projected or already under way by the American Electric Railway Association and its affiliated bodies, has placed a large responsibility on the engineer in the transportation field. Plans for the improvement and standardization of cars, making market surveys in all branches of the industry and obtaining greater economy and efficiency of operation, all call for the highest skill the engineer can furnish.

As to the meetings of the Engineering Association, they showed a remarkable grasp of the problems that have attracted the attention of operating men for a number of years. The various committees made reports that showed a close attention to the subjects and skill in arriving at the proper solution. New equipment and new designs were studied. Latest developments in cars, buses and trolley buses were discussed and their particular advantages and disadvantages analyzed from the engineering viewpoint. Examination of the reports of the sessions and the papers which were presented discloses the breadth of scope coming within the purview of the engineer.

Looking ahead and planning the activities of the engineer for the immediate future, the general convention, as well as that of the Engineering Association, recognized the necessity for progress in five major directions. These were the absolute need for specialized merchandising of the service rendered, improved equipment and facilities, the continued development of design for greater comfort and convenience, the attainment of higher speeds and the acquisition of equitable franchises and rates of fare. The engineer must play his part in the working out of these problems. That is indisputable. The meeting in San Francisco emphasized this fact, and the engineers who were present could not but realize the responsibility which they must assume, not for their own property alone, but for the industry.

T. & T. Urges More Intensive Merchandising

PROGRESSIVE thinking on major topics of the day marked the work of the Transportation and Traffic Association during the past year. Reflected in the committee reports prepared and the discussion of them, at the San Francisco meetings, this thinking will be recorded as a definite contribution to the advancement of the industry. Since 1908, when the association was formed, it has contributed much through the work of its many committees. The 1929-1930 period brings to a head this previous study and advances many new ideas.

Handling one of the most important subjects, the

Digitized by Google

small-city committee continued its collection of data and information. Its report particularly emphasized the need for intensive merchandising. Better selling of the service is the first step the smaller railways should take, and it is encouraging that more attention is being paid to this fundamental requirement.

It is significant that another committee, that on the passenger, should strike down to the foundation of merchandising in its report. Feeling that a better knowledge of the desires of the public for transportation is essential, the committee selected a trained man to establish a scientific method of making market analyses. Intended to determine whether more rides may be sold to the present users and whether non-users can be induced to ride, these surveys will form a standard basis for adjusting service and building up revenue.

Although no direct reference was made to merchandising in the report of the committee on the transportation employee its suggestions for selecting and training men properly will assist in developing salesman. Analyzing the job of each employee is bound to show whether his relations with the public, his appearance and manner, and his ability to do his work will qualify him as a salesman.

Movement of the vehicle, operating economics and equipment were the other subject studies. An analysis of the effect of the automobile on riding is included in the report on the first-mentioned topic. It also gives valuable suggestions on making studies of parking and traffic control. The operating economics report lists many practices generally applicable which have increased revenues or decreased costs. Convincing figures on the beneficial effect of new or rehabilitated cars on revenue and expenses were presented by the equipment committee. Study of the statistics of 40 companies having new cars, and 41 companies operating old equipment, together with a detailed study of two selected cases, led to the one conclusion—that modern cars appreciably increase passenger revenue.

An Opportunity for Utilizing the Art of the Drama

KEEN interest is felt by all electric railway men in their industry and the discussion of its problems, but it is too much to expect that this interest should be so strong as to render them oblivious to the manner in which the subject under discussion is presented. A bright, lively presentation catches and holds their attention whereas a dull tedious presentation allows their interest to slip away. At electric railway conventions, too much reliance is sometimes placed on the importance of the subject as a means of holding the interest of the delegates, and not enough thought given to making the presentation effective. As a result, vital matters frequently do not receive the attention they deserve. It is a great pity that this condition should exist. The opportunity afforded by the annual A.E.R.A. convention for group consideration of transportation problems by executives from all over the country comes but once a year and it is extremely desirable that the fullest possible use be made of this opportunity.

To find a remedy for this situation is not easy. The busy railway executive has no time to study oratory before going to a convention to make an address. It would scarcely be diplomatic for the program committee to offer detailed suggestions in advance to the speaker. One possible solution of the problem might be for the committee to secure the advice of an expert on program arrangement. A man of this kind could render valuable service not only in suggesting how to treat individual subjects most effectively, but also in suggesting how best to arrange the various topics to be considered at each session and how much time should be allotted to each to avoid wearying the delegates. He might also be able to suggest a better balance between formal addresses, committee reports and informal discussion. In short, he would apply the art of the drama to making the program attractive.

It is no criticism of those responsible for the electric railway convention programs that something of this kind is needed. The members of the program committee are transportation men, not dramatists. But experts on the principles of program arrangement are available and could well be utilized. This would in no way detract from the impressiveness of the sessions. Even the most important subject gains emphasis from an interesting and effective presentation. A convention program should be more than a mere collection of topics which are believed to be timely and interesting. It should be put together with the same care that is exercised in the arrangement of a theatrical program in which each act is considered in its relation to the other acts.

Co-ordination Ahead for Chicago

VOTERS at Chicago on July 1, by an overwhelming vote approved the new franchise ordinance calling for co-ordination of all local transportation agencies. That augurs well for the future. Of course, the measure is not perfect. No human document ever is, but it is undoubtedly the best plan that has been proposed.

The old franchises were unsatisfactory in many ways. The idea behind them was to tie the companies up tight. And that they did. It is surprising that under them the companies did as well by the people of Chicago as they did. So far as it was possible to do so under the restrictive grants in force progressive managements of both the surface lines and the elevated have given the public a taste of what could be expected under a grant fair alike to the companies and the city. They kept faith in the larger sense of their civic responsibility. And they have been rewarded and the city has been rewarded by acceptance of an ordinance probably without parallel in the annals of franchise grants of the kind.

It will take some time to work out the financial details, but the stage is all set. Financing is a matter of technique. While this is also true with respect to the plan for the expenditure of $60,000,000 within the next three years and $200,000,000 within ten years, the work of aligning the properties physically can be begun at once and may be expected to proceed promptly.

In the form in which the grant was finally adopted and now passed the ordinance represents many years of effort to find a solution to the question and many months of intensive work by various officials and civic groups. Under it the new co-ordinated company, the Chicago Local Transportation Company, will be enabled to give the millions of people patronizing its lines efficient and satisfactory service. Transportation in Chicago may now be expected promptly to get into step with the march of progress of the city's other utilities. That has been a hope long deferred. Now it should soon be realized. Both the companies and the city are to be congratulated on the outcome.

Digitized by Google

Newly-Elected Presidents

of the AMERICAN and AFFILIATED ASSOCIATIONS

1. **J. H. HANNA,** elected president of the American Electric Railway Association, is president of the Capital Traction Company, Washington, D. C., with which and its predecessors he has been connected since 1894. He knows that property and the personnel intimately, and he knows the transportation industry. He is the first man ever to have been president of both the association and its affiliated body of engineers. Long has he been active and prominent in association work. He is well known and well liked, locally and nationally. He is an engineer with vision, as his administration of the Washington property testifies. Mr. Hanna was graduated from Princeton in 1892 as a civil engineer.

2. **L. D. BALE,** elected president of the American Electric Railway Engineering Association, is superintendent of the power department of the Cleveland Railway. His greatest contribution to the industry is the work that he has done in developing the automatic substation. He has seen service with the Louisville Railway, the St. Louis Transit Company and its successor, the United Railway, and with the Cleveland Railway, with which he became associated in 1908 and for which, starting in 1911, he revamped the entire power supply system. He has been unusually active in association affairs. He studied at Rose Polytechnic Institute, but not until after he had served as an apprentice with the Louisville Railway.

3. **PAUL E. WILSON,** elected president of the American Electric Railway Transportation and Traffic Association, has been connected with the Cleveland Railway since 1902, but not continuously. His first work was as office boy. Again he was with the company from 1905 to 1908, in the operating department. Then he served the Cleveland *Leader* and the Cleveland *Press* as reporter, studying law meanwhile at Western Reserve University. His return to the railway dates from 1910. His advance to the post of vice-president and secretary was rapid.

4. **C. E. REDFERN,** elected president of the American Electric Railway Claims Association, is claim agent of the United Electric Railways, Providence, R. I. He entered the service of the predecessor of that company in 1900 direct from business school, transferred to the claims department in 1902, and was made claim agent in 1907. His chief interest is in safety work because of its direct bearing on the affairs of his company and its humanitarian aspects. He is on the executive committee of the National Safety Council and is a member of the Governor's committee in Rhode Island on street and highway safety. Mr. Redfern was admitted to the bar in 1921.

5. **C. E. YOST,** elected president of the American Electric Railway Accountants' Association, is treasurer of the Delaware Electric Power Company, Wilmington, Del. This company is the successor to the Wilmington & Philadelphia Traction Company with ramifications more extensive than the company's title would appear to imply. In the work of the company, Mr. Yost has played a very important part.

Digitized by Google

Co-operation Is Essential To Meet *1930's Challenge to Transportation*

In his presidential address before the American Electric Railway Association Mr. Shoup points out the problems that confront the industry and outlines a means of solution

By PAUL SHOUP

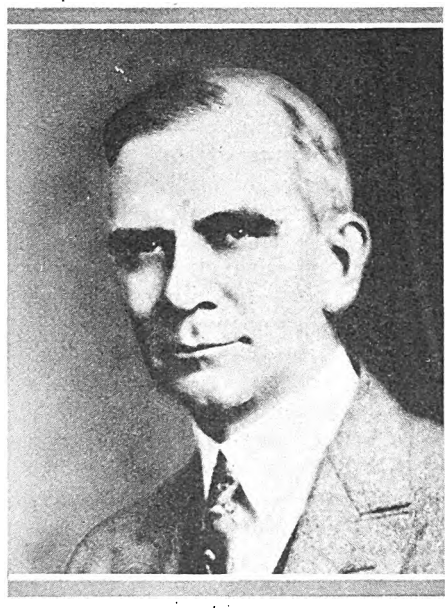
President American Electric Railway Association,
Chairman of the Board Pacific Electric Railway

DURING the fifteen years since the American Electric Railway Association held its annual convention west of the Rockies, many changes have occurred in the whole transportation structure of the nation, the local transportation industry in particular. It has been forced to contend with shifting economic, political and social forces that have put to a most severe test the industry which you represent, and in which there is invested some five and one-half billions of dollars; almost a fifth of that invested in steam railroads.

Out of this battle for existence there is coming a more virile industry. Useless branches of the transportation tree have been swept away by the storm of conflict or removed in the interest of more efficient service. The trunk remains permanently rooted in community soil.

You may well take pride in the recent record of the industry. We are passing through a general severe industrial depression. The output of some of our major industries has been temporarily greatly curtailed. Our local transportation industry has shown only moderate effects from these depressing causes. A non-essential or fading industry does not establish a record like that in times of depression.

It has been increasingly apparent for twenty years that transit and traffic conditions in American cities should receive attention. Transportation facilities in the majority of the larger cities of the country have been permitted to fall far behind the standards for other elements in modern urban life. Measured in terms of convenience, comfort and safety, the conditions to which people in most cities are subjected when they attempt to move about, reflect little credit upon American progress. Inconvenience, crowding and dangers encountered in riding, driving or walking in congested traffic areas have come to be accepted as almost inevitable. That should not be so.



Paul Shoup

The remedy for these conditions lies in the hands of transportation men and the public working co-operatively. It is part of our job to show the public what the remedy is, and how we can join hands and apply it. The job is worth doing, and worth doing well. Unless I am greatly mistaken, eventually it will fully reward the men who do it.

Companies providing public transportation service in cities are seriously handicapped by the lack of public understanding of the problems involved and consequent lack of public co-operation. Measures for the improvement of the service naturally raise many public issues that are complicated, and to some extent of a technical nature. Any sound program of improvement must put the needs of the community as a whole above the interests of a particular section or group, but partisan politics, prejudice, and, finally, selfish interests of individuals or groups, tend to obstruct progress. There is need, therefore, for a better understanding by each community as to transportation policy that will be most beneficial to it as a whole.

Back of our so-called street traffic problems lies the major problem of transportation. Traffic and transportation are closely related in their activities. It is not my part to discuss a solution; I will mention but a few of the problems that are up for solution. These concern not only our companies engaged in this public service, but the cities and communities thus served.

Digitized by Google

Here is a vital and necessary utility service which carries seventy-five per cent of all the people who move daily in and out of the central areas of large cities. The industry ranks about eighth in the amount of invested capital in the United States. But while the difficulties of other industries attract attention as national business problems, the long protracted struggle of the local transportation industry to maintain a vital public service while handicapped by serious economic and political obstacles attracts far less public attention than is warranted by its importance.

This situation is the more to be lamented because of the fact that relief can be given at no expense at all to the public. With such relief will come a vast improvement in personal comfort, in convenience, in maintenance of home and business values, and creation of new values for all the people of the communities served.

It is absurd, as was shown by the recent report of a State Taxation Committee of the State of California, that the electric railway industry—the least remunerative of industries in this state—should be bearing the highest tax relatively compared with all other public service corporations. It is absurd that these companies should be compelled to continue the paving and maintenance of sections of streets and highways—in many instances the major part—when it is the tremendous traffic of the last few years of motor vehicles used in private service that is wearing them out.

The uncertain policies of the cities with respect to franchises, whereby the owners of invested capital do not know when it will disappear absolutely, and the thoughtless use of police power that puts added operating burdens upon the companies in so many localities, can be so easily and simply removed, in so far as the mechanics of the problem are concerned, that it seems almost unthinkable that enlightened policies have not been established, since they are so essential to the life and growth of the cities.

Experience has indicated that the construction of rapid transit structures, either subway or elevated, is not a suitable field for the investment of private capital. Due to high fixed charges, the riders cannot furnish revenues sufficient to carry the fixed charges, and maintain these structures. The question then arises, if the necessity takes on a conclusive aspect, as to who is benefited, and who should help carry the charges that are not properly allocable to the riders, because of the greater convenience and more rapid transit given them in their transportation.

It is believed by some students of this question that a clearer understanding is needed of the distribution of benefits from transit improvements among the several groups in a city which are affected thereby; namely, the community as a whole, property directly enhanced by the location of transit lines, and the riders who use the service. Though the property which receives direct benefits from the location of transit routes plays a very active part in dictating the location of lines and even of stations, it has so far failed to carry its proper share of the construction cost burden. In this fact seems to lie the difficulty both financial and political of providing adequate rapid transit.

Few companies in the United States are able to pay a satisfactory return to their investors, even though the average rate of fare has steadily risen during the past decade. In consequence, the financial and physical status of electric railways in many cities is in serious jeopardy. As a result, the communities are faced with large expenditures for increased street capacity, because the public very naturally prefers to use its automobiles as a substitute for public transportation when the latter is not permitted, through either political, physical or economic handicaps, to develop the class of service to which the public feels itself entitled.

Nor is the outlook for other public agencies of urban transportation much better without adequate public co-operation than is that for street cars. The bus, though rapidly finding its level as an adjunct to other transportation agencies, offers no permanent solution of present difficulties. It merely furnishes another tool of transportation that fits in between the individual automobile and the street car, and is particularly adapted for furnishing certain forms of service. In general, it has been clearly established that the wholesale replacement of street cars with buses, though it would involve the wiping out of an investment amounting to several billions of dollars in present street railway plant and roadbed, would complicate rather than simplify the urban transportation and traffic problem. One fact is definitely established: in any city, buses and street cars need to be operated in harmony and under one management.

Next, we come to the individual public vehicle—the taxicab. Here again we find an unsettled and unsound financial condition. As a matter of fact, the situation is such that it is unattractive to responsible capital and the growth of unregulated and destructive competition has resulted in widespread evils, and in some large cities is a major factor contributing to the traffic congestion problem.

Thus we have in every form of public transportation service in cities, in rapid transit, street railways, buses and taxicabs, the same general situation—unstable and unsatisfactory present conditions which threaten to become worse. At the same time there is no generally accepted policy under which these facilities may be expected to grow and develop.

The conditions to which pedestrians are subjected in present day traffic are a serious reflection upon our ability to provide for the intelligent and safe use of the machines which we ourselves have created. All of this is attributable to destructive policies, inadequate planning, and improper regulation to meet changing conditions. There seems to be great need for more general recognition of the relation between transportation and traffic in order that improvement programs may be developed on a basis broad enough to insure substantial relief and to provide for future requirements.

The situation has been summarized for me in this sentence: Cities cannot get along without local public transportation, and local public transportation cannot get along without the cities. But the cities and communities need to realize their obligations in this connection, because of their own interest, irrespective of the contractual relations that were entered into under different conditions when those companies first took on the obligation of carrying the public locally. The congestion in the business areas reaching points of stagnation, as I have said, makes more essential than ever before a complete co-operation involving the city governments, the public organizations seeking to solve the problems, the automobile associations, the transportation companies, and the individuals. These last named are very changeable, having, as each one of us knows, varying viewpoints according to whether they are on foot, riding in street cars, taxicabs, or in automobiles, or merely the immobile statues of patience waiting for these moving activities to get out of the way.

Digitized by Google

Meeting the Problems of Today in the Transportation Field

American Association sessions discuss vital subjects affecting the industry from many angles

THIS year three sessions of the American Electric Railway Association were held at San Francisco, on June 23, 24 and 25. The general theme of the convention was "1930's Challenge to Transportation Men." Each day the subject was treated from a different angle. On Thursday there was no formal meeting, but a general luncheon conference was held at the Fairmont Hotel, at which those present informally summed up the convention.

Monday's session, which marked the opening of the convention, began with the presentation by the chairman, President Paul Shoup, of Hon. A. J. Rossi, acting Mayor of San Francisco, who welcomed the delegates in most cordial fashion.

In his presidential address, Mr. Shoup sketched the development of the local transportation industry, pointing out the essentiality of the service rendered and the impossibility of building up great cities without adequate transportation.

Following Mr. Shoup's address, D. W. Pontius, president of the Pacific Electric Railway, Los Angeles, delivered an address giving in some detail the things that can be done to improve interurban operation and revenues.

"Making the Most of Existing Street Railway Properties" was the subject of an address by Samuel Kahn, president Market Street Railway, San Francisco. The problem, he said, is the same as it was in the horse car days. The desirable features of service include speed, frequency and comfort. The standards by which the public measures the service, however, have changed and it has been necessary to revamp the traction systems time after time. He believes it is necessary to cater to the needs of the patrons and to their whims as well. Fast schedules without layover, he thinks, are essential if a company would succeed.

Abstracts of the addresses appear elsewhere in this issue.

The Industry's Plans to Help

TUESDAY morning's session of the American Association opened with the report of Managing Director Charles Gordon. He emphasized that in order to provide a satisfactory solution of the street railway problem public understanding is necessary. In order to obtain results it is essential that greater interest be taken in the work of the association and that co-operation be obtained from representative business men in the various cities of the country.

Announcement of the Anthony N. Brady Memorial Safety Awards was made by Mr. Gordon. In his remarks he stated that the record made by electric railways is a bright spot in a generally depressing traffic situation. The electric railways have had a comparatively small number of accidents in comparison with other vehicles operating on the highways; in particular, fatalities are exceedingly low.

The award of the gold medal for Class A roads, those operating more than 5,000,000 car-miles per year, was made to the Duluth Street Railway, with honorable mention to the Ottawa Electric Railway.

The silver medal for those roads operating between 1,000,000 and 5,000,000 car-miles annually was awarded to the Colorado Springs & Interurban Railway, with honorable mention to the Calgary Municipal Railway, Calgary, Alberta.

The bronze medal for those roads operating less than 1,000,000 car-miles per year was awarded to the Lethbridge Municipal Railway, with honorable mention to Montana Power Company, Missoula division.

Nominations were announced by Frank R. Coates in the absence of James P. Barnes, chairman of the committee on nominations. The nominees were elected unanimously as follows:

President—J. H. Hanna, president Capital Traction Company, Washington, D. C.

First Vice-President—G. A. Richardson, vice-president and general maanger Chicago Surface Lines, Chicago, Ill.

Second Vice-President—J. H. Alexander, president Cleveland Railway, Cleveland, Ohio.

Third Vice-President—W. A. Draper, president Cincinnati Street Railway, Cincinnati, Ohio.

Fourth Vice-President—W. E. Wood, vice-president Engineers Public Service Company, New York, N. Y.

Treasurer—Barron Collier, president Barron G. Collier, Inc., New York, N. Y.

Members-at-Large of Executive Committee:

Operating Members (Three-year term)—Dr. Thomas Conway, Jr., president Cincinnati & Lake Erie Railroad, Philadelphia, Pa.; G. J. Kuhrts, president Los Angeles Railway, Los Angeles, Cal.

Manufacturer Members (Three-year term)—E. P. Waller, manager transportation department General Electric Company, Schenectady, N. Y.; C. R. Ellicott, vice-president Westinghouse Traction Brake Company, New York, N. Y.; A. A. Hale, vice-president Griffin Wheel Company, Chicago, Ill.

Myles B. Lambert was elected to fill the unexpired term of E. D. Kilburn, resigned.

E. J. McIlraith, Chicago Surface Lines, addressed the meeting in the absence of G. A. Richardson, vice-president and general manager of the same company. He outlined briefly the work done by the committee on street traffic economics. Mr. McIlraith believes that use of the streets must be regulated in order to help a city grow in a logical manner.

Decentralization of some businesses, such as grocery stores and drug stores, is desirable, according to Mr. McIlraith. These businesses are more or less local in character and there is no advantage in concentrating them at a few points. Other businesses should be grouped together in order to get the best economy of time of those working in them. He believes that centralizing of many lines of business is increasing and

Digitized by Google

cited New York, Chicago and other cities as proof of this. With this development under way the street railway is not on the way out but is going ahead along with this tendency. In Chicago ten years ago there was a question of whether the streets would be adequate to handle the traffic that was being offered and whether it would not be necessary to distribute business over a much wider area on that account. Today, he said, there is no doubt about it. Changes in traffic regulations and elimination of parking have made it possible to move such an enormously increased number of people in and out of the central district that there is plenty of space for growth in business interests for years to come.

Street railway men must take the leadership in traffic regulation and control in order that it will serve the whole public. Signals of archaic type have been developed and introduced in cities to their great detriment. Mr. McIlraith gave several instances of this, indicating that advanced forms of traffic control are absolutely essential.

Progress in meeting the industry's equipment problem was the topic of an address by Dr. Thomas Conway, Jr. Dr. Conway outlined the work that has been done by the present committee which has been formed to investigate the problem of better design of street cars. He indicated that a new method of approach must be adopted in order that cars may be designed which will better meet the needs of today and can be sold at reasonable cost.

Edward Dana, general manager Boston Elevated Railway, addressed the meeting on the technique and possibilities of conference training for employees, summarizing the work done by the committee on employee training. This committee, he said, believes that the conference method of training is the most important that can be adopted in instructing employees in the technique of their positions. Methods already in use to train men to do their work on the cars efficiently is entirely satisfactory. What is needed is training for salesmanship—selling rides to customers. The most striking feature in the conference method is that it interests the individual worker. Considerable work has been done in the past few years in training foremen through conferences. The experience gained in this is most valuable in formulating plans for a broader type of training that can be adapted to all employees. Experience indicates that what should be taught is customer contact. The first thing necessary in selling car rides is to determine what is a satisfactory ride, and the next necessary thing is to determine what is satisfactory service.

Edward Dana

H. G. Taylor

Who presented addresses before the American Association

The conferences that have been successful in Boston in carrying out this plan have been quite short, lasting one to 1¼ hours. It has been possible to interest all of the men and to have each one take a part. Mr. Dana outlined in some detail the courses offered to foremen and supervisory officials in Boston. He stated that it is necessary to emphasize the relationship of the employee toward his job and toward the public. It also is necessary to develop in him a feeling of loyalty and desire to give the best service possible. Another need in the training is to develop a technique of customer contact. In this particular the conference method is the only approach that is of value in instructing adults.

Future of Public Control

AT THE Wednesday session of the American Association the *Electric Traction* Speed Trophy was awarded for the year to the Chicago, South Shore & South Bend Railroad. The presentation was made by J. M. Bamberger and the cup was accepted by W. A. Sauer, vice-president of the railway.

Mr. Shannahan reported on the relations of the association with the United States Chamber of Commerce. This, he said, is the only way the American business man has of making his needs known and it is essential that the electric railways be recognized as a vital element in American industry.

Mr. Shannahan then discussed briefly the relationship companies should have with their employees. The man on the platform of the car is our greatest potential asset, he said. Every operator should take advantage of the plans that have been developed by Mr. Dana's committee on employee relations and adapt them to its individual needs. He told in some detail of the change in sentiment of the public in Omaha since he has been associated with the company and where the public relations were previously very unfavorable. The improvement he credited to the work of the trainmen in engaging the support of the riders and the voters in general. This support made it possible to have a new franchise presented and adopted. Later on the same men made it possible to obtain a much-needed increase in fares.

H. G. Taylor, manager public relations, car service division, American Railway Association, addressed the meeting on the advances in transportation and the problems that have been brought with them. He mentioned briefly the great development in air transport during the past five years, and also the development of the motor bus. The bus, he said, has now taken its place alongside the street car, not to replace it nor to compete with it, but as an ally. Economic conditions must be recognized in the determination of rates of fare, according to Mr. Taylor. This contemplates regulating traffic conditions, which are chaotic all over the United States. The sentiment in favor of automobiles as against everything else, he believes, is waning and the street car is coming back into its proper field.

Digitized by Google

Need of better street cars was emphasized by the speaker. As illustrating his point, he told of the progress made by the steam railroads, which since 1920 have put a large amount of capital into the business and as a result have been able to obtain economies resulting in a great increase in net revenue. The program for improvement of car design which was adopted at this convention he believes is excellent and that it should lead to good results. Old cars, he holds, advertise the business as decadent and should be retired as soon as practical.

Mr. Taylor believes that there should be close co-operation between street railways and public utility commissions. There should be an interchange of information and better understanding of the problems involved. As to the future of the street railway, he is optimistic. He believes that it is an essential industry. However, the idea must be sold to the public that it is superior to any other form of transportation in its field and he believes that this has not yet been done.

An outstanding address was delivered by John E. Curtiss, chairman Nebraska State Railroad Commission, on the subject "Public Responsibility in Regulating a Competitive Industry." Illustrating his remarks with pointed anecdotes, Mr. Curtiss said that competition itself makes a very effective regulation which determines the maximum rates that can be charged and dictates to the managements the need for efficiency and economy.

An address on the subject of taxation was read by M. D. Lack, tax counselor California Taxpayers' Association, Los Angeles.

An address on the subject of "National Relations," giving the results of the work accomplished during the year by the American Association committee on that subject, was read by Ralph Bradley in the absence of C. D. Cass, general counsel American Electric Railway Association.

Following the adoption of report of the committee on resolutions the new officers present were installed. The meeting closed with an ovation to the retiring president, Paul Shoup.

Luncheon Conference Summarizes Situation

AS A FITTING climax to the convention, a general luncheon conference was held Thursday noon, after the official closing of all other meetings, for the purpose of summarizing the high spots of the convention and analyzing the future prospects of the industry. The chairman was D. W. Pontius, president Pacific Electric Railway.

In opening the comments on the convention, Dr. Thomas Conway, Jr., Cincinnati & Lake Erie Railroad, spoke of the President's Conference plan and its purpose of co-ordinating all developments of the past and future in the perfection of the street car. He cautioned against the expectation of startling results immediately and stated that only through a slow, orderly advance could progress be made. "The success of the efforts," he said, "depends on the co-operation of all electric railways and manufacturers."

Frank Karr, Pacific Electric Railway, gave his impressions of the convention and the principal things derived from the meetings.

Striking the keynote of the convention activities, W. B. Brady, Central Public Service Corporation, voiced optimism in the future of the industry because the problems are being attacked scientifically. He pointed to the new car plan, the recognition of the need for merchandising, the specific efforts in this respect through the introduction of market surveys, and the further studying of what properly may be termed a scientific fare structure.

Samuel Kahn, Market Street Railway, lauded the seriousness with which the problems of transportation were attacked, and cited the convention as the beginning of a new era.

That the association must broaden its scope of activities and include every form of public transportation was the view expressed by Julian M. Bamberger, Bamberger Electric Railroad. "We cannot be satisfied," he said, "with being street railway men. We must become public transportation men." Mr. Bamberger also commented on the lack of symposiums, discussion and attention to the problems of the interurban, and voiced the opinion that some means must be obtained of securing more collective data on specific problems.

Acquainting the public with the industry's problems and burdens is one of the vital needs, according to A. J. Lundberg, Key System Transit Company. Before giving them the facts, however, the railways must put their house in order, he added.

In the opinion of R. O. Crowe, Los Angeles Railway, the biggest thing which the delegates will carry from the convention is a renewed enthusiasm and faith in the industry.

"Find out how to sell your product," was the advice given by O. A. Smith, Pacific Electric Railway. Mr. Smith commended the merchandising activities started during the past year and added that all of the fundamental problems of the industry must be attacked from a merchandising angle.

Attractive service and well trained salesmen are the two biggest needs at the present time, according to A. T. Mercier, Pacific Electric Railway.

"The President's Conference plan and the making of surveys to determine what the public desires," stated Edward Dana, Boston Elevated Railway, "will open up a new effort in accomplishing the plans for modernization which have been under way for some time and which all railways have considered necessary."

J. M. Shannahan, Omaha & Council Bluffs Street Railway, commented on the seriousness with which the delegates engaged in the meetings and praised those responsible for the perfect convention arrangements and the splendid entertainment provided.

Three subjects, all of vital importance, were covered very thoroughly at the meetings, the comfort and convenience of passengers, fares, and speed. "The full discussion of these," stated J. H. Hanna, president of the Capital Traction Company and new president of the association, "will go a long way in attracting riders and making the public desire to use the service."

S. B. Way, Milwaukee Electric Railway & Light Company, commented on the service rendered by the San Francisco systems, and praised the work of the committees in charge of this year's program.

Charles Gordon, managing director of the association, summed up the high points of the convention and added an optimistic note to the closing. The obtaining of the other man's view at a convention of this kind, he pointed out, enables the interpretation of his ideas and the use of these throughout the entire year. Mr. Gordon spoke of the great responsibility, other than that of moving people, of acquainting the public with the problems and learning more about how the people wish to travel.

Digitized by Google

Vice-Presidents and General Officers of the A.E.R.A. for 1930-1931

G. A. Richardson
First Vice-President

Guy C. Hecker
General Secretary

Barron Collier
Treasurer

J. H. Alexander
Second Vice-President

W. A. Draper
Third Vice-President

W. E. Wood
Fourth Vice-President

Newly-Elected Members of the Executive Committee

1. E. P. Waller
2. Dr. Thomas Conway, Jr.
3. A. A. Hale
4. C. R. Ellicott
5. G. J. Kuhrts

Digitized by Google

CO-OPERATIVE EFFORT

Is Essential

By CHARLES GORDON
Managing Director
American Electric Railway Association

Charles Gordon

COMPARED with other classes of utility services, local transportation companies are seriously burdened by limited man power and small staffs—particularly at the top. The long period of inadequate earning and unsettled future which we have experienced, has forced the most rigid economy in every department. Consequently, the chief executive of the average company is burdened with a heavy personal load.

There is still another situation which is above all the most discouraging with which the executive of a local transportation company has to deal. This is brought about by destructive tactics of the self-seeking politician who has little sincere interest in the transportation problem beyond the opportunity which it offers to get himself favorable notice in the press as a champion of the people at the expense of a corporation. The railway executive seeking intelligent public consideration of the many problems which he faces in his effort to preserve and rehabilitate a vital service to the public, is still frequently hamstrung and kept on the defensive by this type of political buffoonery.

Nevertheless, the situation with which an individual company contends is in a large measure circumscribed and materially influenced by developments in many other communities. Consequently, the action of each management and each community influences the situation of every other property in the country. Collective study of common problems and the very closest possible co-operation between companies is therefore of paramount importance.

Those of our current problems which lend themselves best to collective action, divide logically into six principal elements. Three of these have to do with the technique and methods within our industry; the other three involve questions of public policy which we can influence only indirectly, and then only in the development of policies and the application of measures intended to serve the best interests of the community as a whole.

Within the first group I place the equipment with which we render service—the general character and performance of the cars which we operate. The importance of this question has been recognized for several years and it has a prominent place on the program of this convention.

Second is the human factor in our business; that is, the attitude and the skill displayed by our employees in direct contact with the public.

It is absolutely essential that we have their full co-operation. But loyalty and the desire to co-operate are not alone sufficient. In addition, modern transportation conditions require a high degree of skill both in the operation of equipment through congested streets and in dealing with the public that boards our cars.

The third factor is the method of charging for our service. First of all, the product itself must be saleable. Next it must be sold by the people with whom the public is willing to do business. Finally, the price must be right. Other factors have an important bearing. Not the least of these is the presence of competition. Where it exists it exerts a strong influence on the making of rates or prices.

Turning now to questions of public policy upon which we can do little more than seek intelligent co-operation, there are again three principal problems which lend themselves to co-operative effort by the industry. There are three outstanding questions —taxation, franchise terms and regulatory policy, and the extent to which the efficiency of public transportation is recognized in seeking relief from street congestion.

All three of these topics—taxation, regulation and the economics of street use—have an important place and I shall do little more than merely mention them.

As I have already indicated, the development of local transportation is so interwoven with that of the community itself, that many of our problems are likewise public problems. If we are to unite upon the advocacy of measures based on certain general principles, these principles must be sound from the standpoint of the public interest, not in one community alone, but in cities of various sizes and varying characteristics throughout the nation. We know that the action of one community frequently affects many others. We have had ample evidence of this in matters of franchises, fares and taxation. We also know that each operating property is dependent for its development upon the state of the technical art in the industry as a whole. This is illustrated by our present efforts to develop more satisfactory types of car and bus equipment. With all this in mind, therefore, the importance of co-operative planning and co-operative action cannot be over-emphasized.

I am convinced that the business in which we are engaged renders a vital and necessary service which the 16,000,000,000 passengers who use it each year could not get along without.

There is every reason to believe that the business of providing public transportation service can be put on an economically sound and stable basis. I am fully aware of the difficulty and complexity of the problems involved. But I am hopeful that with your continual confidence and co-operation we may make steady progress and that my reports in the future may be expressed not in words but in results.

Digitized by Google

Meeting the Industry's *Equipment Problem*

Progress of the work of the Presidents' Conference Committee summarized in a significant address before the American Association

By THOMAS CONWAY, *Jr.*
President Cincinnati & Lake Erie Railroad
Chairman Philadelphia & Western Railway

IT HAS been generally recognized by the industry that progress is required in two directions: (1) improvement in the character of service rendered so as to make it more attractive to present and prospective patrons; (2) a substantial reduction in costs. Both factors are controlled largely by the design, age, condition, performance, weight and cost of the equipment operated.

Thus we are brought to the inevitable conclusion that the cars which we operate represent in large measure the key to our problem. For several years the industry has been aware of the evils attendant on the operation of the large number of obsolete and heavy cars that are in service, and it is gratifying to note that in the year 1929 a total of 1,496 new cars and locomotives were purchased by electric railways as compared with 897 in the year before.

In spite of the fact that the total number of cars purchased by electric railways in 1929 was 68 per cent in excess of the 1928 purchases and that a substantial number of cars were purchased during the first part of the current year, the progress of the industry in modernizing its equipment continues to be discouraging. There are approximately 74,000 electric railway passenger cars in the United States, most of which are in regular use. Half of these, or almost 40,000 cars, are over twenty years old. These old cars are excessively costly to operate, noisy, obsolete in appearance, and not calculated to stimulate riding or to earn a profit.

What is the reason for this anomalous situation? Why is it that an industry with over $5,000,000,000 of invested capital should cling to antiquated equipment instead of ruthlessly scrapping obsolete facilities as a means of promoting progress and increasing its earning power? The most important reason is that, while substantial progress has been made in the evolution of the railway car, it has not entirely measured up to the expectations or requirements of the shrewd railway executive. The competitor of the railway car is the private automobile and by the standards of the automotive industry the comparative progress of our industry in large part must be measured. Judged by that standard, the evolution of the urban railway car has failed to keep pace with its rival. The 1930 model automobile is infinitely superior to the product of five years ago.

Thomas Conway, Jr.

While the private automobile and motorbus are decreasing in cost, the electric railway car is constantly becoming more costly. Many operators refuse to buy cars to replace old equipment now in service because of what they regard as the prohibitive cost of the type of equipment which they would consider purchasing.

About a year ago a comparison of views and an exchange of ideas began between a number of the senior executive officers of large electric railway properties concerning the problem of car improvement. The upshot of the matter was that at the October, 1929, meeting of the Advisory Council, this question was brought up and thoroughly discussed, and it was informally agreed that steps should be taken by the railway operators to expedite the development of the urban railway car. To that end, I was requested to make a study of the problem and to prepare for submission to a group of the senior executives of our large city properties a memorandum outlining a plan of procedure to achieve the desired end. A notable meeting of the executives of such properties was held in Chicago in December last at which the so-called Presidents' Conference Committee (of which I have the honor to be chairman) was organized. Steps were taken to secure subscriptions aggregating at least $500,000, in roughly equal proportions, from the interested railway companies and from the manufacturers.

At the last meeting of the Presidents' Conference Committee held in Chicago on May 22, a subcommittee was elected to select a chief engineer and to make arrangements therewith. After a most thorough canvass of the problem, the committee unanimously decided that a knowledge of car building or of the operation of railway properties was not a prerequisite to the position and in many ways might constitute a handicap, particularly in the highly competitive situation which exists in the car building industry. We were advised by some of the foremost engineers and business executives of the country, who have had wide experience in handling research projects, that what was needed was an engineering executive—a man who has demonstrated his ability to conduct large research projects and bring them to a successful conclusion; who has shown his acumen in the selection of technicians, each capable of handling a particular part of the work, and who possesses the personal qualifications of winning co-operation and begetting confidence from the engineers and executives of the various manufacturing interests involved.

After a most careful study of the men suggested, the nominating committee, elected by the Presidents' Conference Committee, has unanimously selected C. F. Hirshfeld of Detroit, Mich., who for many years has been head of the research department of the Detroit Edison Company, as the chief engineer of the committee. Mr. Hirshfeld has had a wealth of experience in conducting research projects for his company, for the National Electric

Digitized by Google

Light Association, and for other interests. He is not a railway car specialist; he is relying upon the active co-operation of our master mechanics, of the engineers and technicians of the car builders, the manufacturers of electric equipment and of braking apparatus, and of other groups whose products enter into the railway cars.

In considering how a group of associated operating companies may bring about a radical improvement in the present car situation, which is so important to the industry, two broad courses of procedure are open. The first is for these properties to appropriate a substantial sum of money, hire engineers and proceed to take the initiative in designing, building, and testing one or more cars to meet their requirements. Although this procedure might seem to offer the most direct method of attacking the whole problem and of bringing about immediate results, it contains a number of serious objections, one of which is the problem of finding engineering talent which may be expected to be more successful in producing results under operator sponsorship than could be achieved by keeping the initiative entirely or in large part in the hands of the manufacturers who have had very wide experience in design and in the details of construction.

It seems wise and most important that the whole future of car development should not be contingent upon the success of any one or even several designs. The best results can be expected through the simultaneous effort on the part of as many individuals and groups as can be interested in the problem. By working through and with the present manufacturers, the committee may expect to stimulate the maximum number of simultaneous development projects, which in turn is the method which seems to offer the greatest assurance of ultimate success. By pooling the influence of a representative group of important properties, it can coordinate the efforts of the manufacturers and eliminate confusion.

The committee plans to take advantage of the natural stimulation of competition in attempting to achieve its objectives. Competition between manufacturers in the effort to excel is potentially a strong force, which, if properly stimulated and directed, will tend to accelerate development. It would be unwise, therefore, to stifle this competition by taking development initiative out of the hands of existing manufacturers.

The purpose will be to try out each new idea that is suggested and considered worthy, in such a way that there will be a minimum of duplicate effort and a gradual process of eliminating those features found to be impracticable or too costly. Thus, through co-ordinating the experimental work which is now being done individually by the participating properties, it is believed that the work can be organized among them and among the manufacturers with whom they now deal separately. In addition to its other advantages, the cost to the companies would be considerably less than that for individual effort.

In brief, the program of the Presidents' Conference Committee is one of co-operative effort with every group interested in any way in the construction of railway cars. The committee does not contemplate going into the car building business; it is not seeking to destroy or restrict the field of activity of any car builder or car equipment manufacturer. It will strive to co-ordinate the efforts of these groups; to bring to a focus the minds of the engineers and technicians in these industries; to stimulate inventive ingenuity; to finance worthwhile experiments and to try out the experimental product to determine its practical usefulness.

It is estimated that the railway properties whose chief executives are members of the Presidents' Conference Committee represent over 60 per cent of the potential car buying power of this industry. It is unusual for a customer to match dollars with a manufacturer for the improvement of the manufacturer's product, but our need is so great that every railway company which has subscribed has done so realizing that if the effort is crowned with any measure of success, it will be repaid many fold the amount of its subscription in the lessened cost of new cars and the betterment of the car builders' product.

The subscribing companies have underwritten the work of the Presidents' Conference Committee for a period of three years. Research and experimental work takes time and it is believed that substantial results cannot be expected in a shorter interval. In order that there may be no misunderstanding, let me make it very clear that whatever advantages accrue from the work of the Presidents' Conference Committee will benefit the entire industry. This is not a little clique of railway companies seeking to gain a selfish advantage. Any railway company may participate in this effort upon the same general basis as those companies which have heretofore subscribed and their co-operation and cash will be most welcome.

In conclusion let me dwell upon one matter which is most important. I hope that the activities of the Presidents' Conference Committee will not deter any railway company from buying new equipment until the committee's work is completed. This would be a great mistake both from the standpoint of the railways in question and the industry as a whole. All progress cannot be wrapped up in the work of this committee. The committee hopes that our member companies will continue to buy cars as usual and, in fact, in larger quantities than heretofore. Many ideas can be tried out in this new equipment to the great advantage of all concerned; many valuable lessons can only be learned by actual experience. In exhorting other companies to go forward and purchase new equipment, may I call your attention to the fact that the company represented by the chairman of the Presidents' Conference Committee has had delivered to it within the last few days new interurban equipment in sufficient amount to enable it to operate its entire interurban property with cars none of which is over three years old, and that the company represented by the vice-chairman of the Presidents' Conference Committee has booked within the last few weeks the largest order in 1930 for electric railway equipment. A substantial number of new cars will be purchased within the next few months by other members of the Presidents' Conference Committee who recognize the futility of waiting until the work of the committee is completed.

The railway industry has suffered untold losses through indecision and delay in striking out boldly along the line of experimental research, which has proved to be the salvation of most of the successful industries of America. Of one thing only can we be certain, and that is that success never comes to him who stands still. We must keep moving; we must show the people of the United States that there is vitality and life in our business; we must buy new equipment—the best that can be designed at the time the purchase is made—relying upon the fact that inventive skill and engineering ingenuity can be relied upon to enable us to bring this equipment up to a reasonable standard of performance and at a reasonable cost.

Digitized by Google

Transportation Men Are

COMMUNITY BUILDERS

Definite obligations rest on the utility, the community and the regulatory body, said the author in addressing the American Association

By JOHN E. CURTISS
Chairman Nebraska State Railway Commission

WE ARE living in a day and age of tremendous rush and hurry. We are being carried along in an hysterical atmosphere of getting some place quickly, and of doing things rapidly.

Accordingly, I suggest that in the midst of this atmosphere of speed, it is well to gather together on occasions such as this, renew acquaintances, and discuss problems of common interest and importance. Surely from such a convention as this comes enthusiasm for the daily task.

I believe in optimism, in spite of Owen Wister's thought that common sense repudiates both optimism and pessimism. Someone said an optimist is a man who sees the light that isn't there, and a pessimist is a fool who is trying to blow it out. As between those two types, and we have them both in this great country, we all prefer to mingle with the man who attempts to see the light that perhaps isn't always there, but in spite of that fact, is struggling forward and on.

Quite naturally there are problems to be solved. Problems of government, problems of industry. They are frequently inter-related. Your industry has them, every industry has them, and in their solution we must have leadership. You have perhaps heard of the fellow who was standing along the curb when a great crowd dashed by. He watched it pass and then started out on the run to catch up with it. He pulled a fellow from the rear of the crowd and said: "Where's this crowd going?" The man replied, "I don't know." Again he rushed on and caught up with the crowd and pulled another man out of the rear of the crowd and said, "Where's this crowd going?" This man replied, "I don't know, I'm merely following it." The stranger said, "Well great heavens, man, I've got to find out where this crowd's going. I'm its leader."

John E. Curtiss

There is plenty of that kind of leadership today. The kind of leadership that involves following the crowd in the direction that it goes, rather than being out ahead pointing the direction in which it might properly go. Plenty of leadership that involves bringing together facts—but not too many, not enough to be embarrassing — mixing them together with a loud noise, indulging in mental gymnastics, a bit of legerdemain, some violent waving of the arms, and then, like finding the rabbit in the hat, reaching down in the can and pulling out the answer. We need men and women today who can see straight, think fast, and above all else, act honestly.

Indeed we live in a universe of law. This is true in the field of science, but it is just as true in the field of economics and of finance. Certain fixed results are sure to follow certain definite transactions. There is no financial escape from receivership when a company fails to earn fixed charges. There is no escape from embarrassment that follows, both to the utility and the community, when such a return is not paid on the value of the properties as will attract the necessary capital to provide for the proper development of the industry. There is no escape from unfortunate results that follow improper public relations, when the management, that is, the employer and employee, fail to understand the customer, and in a courteous manner render the highest type service possible.

And so, in the midst of constant change, we move forward. Accomplishment that a few years ago was declared impossible, is today accepted as commonplace. Probably the most important discovery made in our generation is that we know practically nothing about anything. Having discovered that, we place ourselves in the position to move forward, and no industry can be listed among the casualties so long as it understands that there are further problems yet to be solved and that they can be solved—will be solved—in the light of constantly changing conditions.

So I say, change is the order of the day, and I know of no industry more directly affected by this change than yours. And in that change, I conclude, comes the inspiration for the subject assigned me for brief discussion—"Public Responsibility in the Regulation of Competitive Industry."

Thirty years ago your industry had well nigh a complete monopoly in its field. You furnished the fastest, most certain, most satisfactory urban transportation. Indeed the opulent citizen owned a team of high-stepping horses and a fine rubber-tired buggy, but this was a luxury enjoyed only by the few, and even those few, together with the masses, depended on you for local transportation.

But we have pressed forward—at least, we hope it is forward. Today the horse and buggy have passed from the picture, and the smell of the exhaust and the roar of the cut-out are endured on every highway, as countless thousands of automobiles—there are more than 5,000,000 new cars sold each year—dash by. Thus your industry, once a complete natural monopoly, bringing to the people of our large communities one of the necessities of life, is now confronted with the keenest of competition from the privately operated automobile, and the publicly authorized taxi-cab. I know of no street railway company in the United States that has been able to avoid the acute prob-

Digitized by Google

lems resulting from this condition.

But with respect to your industry, we have passed through another cycle, and, whereas originally you were a natural monopoly, you now find yourself confronted with the keenest of competition. What is the public responsibility respecting regulation under such circumstances? It is a fundamental principle of regulation that charges authorized by the regulatory body shall be sufficient to pay operating expenses under economical and efficient management and in addition, a fair return upon the value of the property. This principle of course prevails whether the utility regulated be a competitive industry, or a complete monopoly. In other words, the end to be attained is the same in either instance. The means to the end may be different. It appears to be altogether proper that in reaching the end, a different attitude might properly be displayed by regulatory authority, where competition exists, than in the regulation of that utility which operates as a complete monopoly. The Supreme Court of the United States, in the Southwestern Bell Case, said: "It must never be forgotten that while the state may regulate with a view to enforcing reasonable rates and charges, it is not the owner of the property of public utility companies, and is not clothed with the general power of management incident to ownership."

It is always a matter of judgment as to just where management ends and regulation begins. Therefore, as competition reappears in a definite way, it seems that the heavy hand of regulation might be lifted, in degree at least. Competition itself makes for very definite regulation—indeed regulation of rates, service and operating expenses. To be specific, the competition which now confronts your industry, presents a very definite limit to the extent to which rates can be increased, else the point of diminishing return be reached. This very fact compels the most efficient and economical operation. Again this same competition impels you to render the very highest type service possible, that your patrons may not be lost to the competitor. It is a patent fact that officers involved in the management of a utility, have as deep-seated a desire for the successful operation of that utility, as those charged with the responsibility of regulation. Furthermore, they have, of necessity, a more comprehensive understanding of company problems and the possible methods of solution, particularly respecting the manner and methods of meeting competitive effort.

Accordingly, where a regulated industry is faced with actual and effective competition, governmental authority should seriously consider that fact in its regulatory effort. Such regulatory action as is necessary should be prompt. The local industry might easily "starve to death" if regulatory action be tedious and long delayed. And receiverships are always highly unfortunate, not only for the industry, but also for the community. Considerable latitude should be permitted the management in solving matters of service. In so far as it is possible, the management should be given wide discretion in either reducing or increasing service furnished, that competitive effort may be properly met. Again, choice should be permitted the management in reaching conclusions concerning matters largely managerial, such as wages and salaries paid, the proper allowance for advertising, the manner and form of service.

A sympathetic understanding between the utility, the regulatory body and the public served, is highly important and should always exist. The interest which each of these groups has in the problem is a common one. Quite naturally the public does not care to pay a rate higher than necessary, and yet the public has a very definite interest in a rate which is high enough to provide a service that is certain, satisfactory and modern. Such service can only be furnished when a return is paid in amount sufficient constantly to attract the capital necessary to keep the industry modernized. It is, of course, the legal obligation of a regulatory body to grant such a rate.

Confronted with competition, the importance of public relations cannot be over stressed. Whatever the attitude and action of the regulatory body may be, the industry finds that unfortunate public relations can be highly disastrous. In the main, this responsibility is yours. I regard it as your privilege and your obligation to acquaint the public with your problems—problems of finance and service matters. Your contact with the public is in the nature of partnership relationship, and we discover that it is not always a silent partnership, in so far as the public is concerned. Too much silence on your part in honestly explaining your problem to the community you serve may mean some unfortunate noise on their part at a very inopportune time.

I can't say that I am entirely sold on the philosophy which causes us to say, "The customer is always right." He may not be, and it may be your unfortunate obligation so to inform him. Rather would I say, give your patrons a square deal always, and then see that they know they are getting a square deal. Keep no secrets from them. Tell them the story of your problems honestly and constantly. Let them discover that your problem is a community problem. That such misfortunes as come to your industry are verily community misfortunes. Tell them the truth, the whole truth and nothing but the truth.

For indeed you are supplying a basic fundamental community need. The time has not yet arrived, nor does it appear to be imminent, when local transportation service for hire can be abandoned. We have observed the operation of street railways under receivership. In fact we have seen total abandonment of street railway service, temporarily, and in each instance we have seen all manner of business temporarily paralyzed as a result. Accordingly there must be real satisfaction to you in a knowledge of the fact that yours is a labor of service—that you are indeed community builders.

With no thought of being sentimental, I recall the story of the three stone layers. A stranger had been watching their effort from afar. He approached the first and inquired as to what he was doing. With a grunt he said, "I am working for $6 a day." To the second he directed the same query, and discouragedly the man replied, "I am laying stone." To the third man he addressed the same inquiry. For a moment he hesitated, his eyes flashed and his face beamed satisfaction as he said, "Sir, I am building a cathedral." I know of no industry, in spite of the change of the day, which can still say with such satisfaction, "Sir, we are building a community." Certainly in that effort, those charged with the public responsibility of regulation, recognizing a real competition which constantly challenges you, should be prompt and courageous in meeting that responsibility—should approach the problem with a sympathetic understanding that the best interests of the riding public, the community and the utility serving may be safeguarded.

Digitized by Google

Speeding Up Service

The speaker, addressing the American Association, told what has been done in San Francisco by scientific scheduling

By SAMUEL KAHN
President Market Street Railway,
San Francisco, Cal.

Samuel Kahn

EXPIRING franchises; a public somewhat uninformed, often misinformed; structures and equipment in good physical condition but not always embodying the last details of design to meet increasingly exacting passenger demands is a summary of the situation of the Market Street Railway when the present management took it over.

Just what does the public consider desirable in a 1930 street car ride? In following that quest, except for the date, we are treading the same trail followed by the horse car operator. He was required to furnish a speedy ride, at frequent and regular intervals, to carry the passenger in comfort—yes, even luxury—for that day and age. Was not the board seat of the horse car upholstered with its fine Brussels carpet a luxury in the days of plank sidewalks and mudhole streets?

From our experience in San Francisco it seems there can be little doubt about the public's demand for a quieter, smoother ride. The use of rubber shock pads between car body and bolsters; acoustical cloth under the car floor, under the trolley base, and under the air pump base have shown marked results with our own equipment—of all ages and designs.

Are new motors, quicker pick-up and quicker acceleration the only answers to the demand for greater speed without greater hazard? That these features are most desirable is beyond question, of course. But what of the street railway property that is not in a position to install such new equipment? Must it forego the essential benefits of more speed without more accidents?

It has been our experience that it need not. For instance, without change of motive equipment our speed has been increased from 9.4 m.p.h. four years ago to very nearly 11 m.p.h., day and night average, including all stops and delays except layovers. This has been done with a reduction of operating cost which materially helped in attaining an expense reduction which was greater than revenue decline last year.

Service to the public was not decreased, but rather increased 800,000 car-miles annually compared with four years ago. This car-mile increase served to absorb car-hour reductions sufficiently to obviate any reduction in operating force beyond the normal turnover, thus avoiding hardships to employees.

At the same time energy consumption has been reduced, and accidents substantially decreased.

UTILITY TAXATION

Advantages and disadvantages of gross receipts tax are set forth in a paper presented before the American Association

By M. D. LACK
Tax Counselor
California Taxpayers Association

IN CALIFORNIA, the tax situation reached a climax in 1910, when a constitutional amendment was adopted completely changing the revenue system of this state from the uniform *ad valorem* system for the support of both county and state to a separated system, setting up different sources of revenue for state and local purposes. By this separation, there was turned over exclusively to the state for its support those classes of properties such as public utilities, banks, insurance companies and the like which rather readily fell into a class whose activities were not circumscribed by county boundaries, leaving to the counties such properties as could be said to have a local situs.

The act of separation provided a tax measured by gross income, or gross receipts, for the former classes, with gross premium taxes for insurance companies, a capital stock tax for banks, and a franchise tax for business corporations; the tax to be collected from these classes was designated as strictly and exclusively a tax for state purposes, at least payable exclusively into the state treasury, and subject to its appropriation.

The state tax on these classes of taxpayers was made a tax in lieu of all other taxes and licenses of every kind, except payments agreed to be made to certain subdivisions for rights-of-way, franchises and the like, and neither the counties nor the cities were thereafter allowed to levy any tax against the property of these classes, when such property was used in the operation of their business, or in the production of the gross income which served as the measure of the state tax.

In return for the withdrawal from taxation from the counties of these classes of property, those subdivisions were no longer required to collect or to pay any tax for state purposes on their remaining properties, except that the act contained a

Digitized by Google

clause reserving the right, never yet brought into use, for the state, in case of an emergency, to levy an *ad valorem* tax on all classes of property, both state and local, equally, to take care of such emergencies.

Advantages and disadvantages of the California gross receipts tax might be summarized briefly as follows:

First, as to its advantages: It is certain, not subject to variation because of too much latitude for the exercise of individual judgments; it is simple of administration; it substitutes one central state authority with which to deal in the consideration and administration of the tax on operative property in lieu of a number of independent officials limited only by the number of cities and counties in which the property is operated.

Objections that may be urged against it are: Inequalities of tax burden between members of the same class of operators or utilities; tendency to remove the intelligent interest in and influence upon state expenditure programs by relieving the citizen of any direct tax for state purposes; creation of a tendency of both state and local subdivisions to transfer expenditures from one to the other, and, more serious still, for particular locally-supported activities to advocate additions to their income or revenues by persuading local citizens to join them in advocating that the state make a new or greater contribution to such activity on the theory that the local portion of it is too great by comparison, and thus securing their co-operation to bring about increased state contribution on the almost universally erroneous theory that it will reduce the local tax burden; the inclination to discontent between the two classes of taxpayers, growing out of the fact that the different methods of levy are not easily comparable as to equality, with the resultant tendency to conclude, on the part of one group, that the other is carrying less than a fair share of the load.

Interurban Revenues

Means of popularizing passenger service and attracting freight business discussed before the American Association

By D. W. PONTIUS
President Pacific Electric Railway,
Los Angeles, Calif.

REVENUE prospects of the future for the interurban electric railway are, to a great extent, what we make them. We must recognize the industry as a merchandising organization since transportation is the article for sale. There are certain groups of people who will buy our transportation because it fits their need; they realize its many advantages and are quick to see our faults. These form a large and important part of our patronage, and will stay with us so long as the service is satisfactory. There is another group who do not use interurban railway service, but who certainly should use it. At a much higher cost than rail service, they drive their automobiles to shop or to work. A large percentage of this group must sacrifice other things in order to do so. Efficient, dependable service with high-class, modern equipment will eventually bring a great part of them back to rail travel.

D. W. Pontius

Speed of service is an important point, and is demanded by present and prospective patrons. For this reason, we must encourage and to some extent participate in important grade separations; we must protect our private rights-of-way against further unreasonable opening of grade crossings, and endeavor to have eliminated all crossings now established when not essential.

Cleanliness of equipment, courtesy and attention of the platform men is an important feature that must be given constant attention to attract and hold business. Noise elimination is worth while, and this feature is now being given some much-needed consideration.

Retirement of obsolete equipment has been deferred perhaps too long in many cases. While this has been because of the necessity of keeping operating costs down to meet the revenue, undoubtedly this has been carried to extremes in some cases. There is a demand for first-class equipment that must be met.

Serious consideration must be given to the matter of fares. Our company has experimented with reduced fares extensively during the past three years. Fares are now on an unusually low basis, but we are convinced that the right step has been taken to increase the volume of traffic.

What applies to passenger traffic also applies, in a general way, to freight traffic, with the possible exception that probably the competition is more intense in connection with freight. The delivery of freight by trucks directly to the merchant, commonly called "store-door delivery," is, in my judgment, the strongest factor in this competition.

Retrieving of lost less-than-car-load freight traffic and promotion of new less-than-car-load business has been accomplished to a gratifying extent on the Pacific Electric Railway by the establishment of store-door pick-up and delivery. This service, although only begun in March, 1929, at 28 stations, has been extended to 51 stations; showed an increase of 12 per cent in the railway's less-than-car-load tonnage between March and September; and in the fifteen months since its establishment, less-than-car-load tonnage has increased 100 per cent. The railway's cost per ton for handling such freight at Los Angeles has been reduced about 18 per cent. The astonishing and very pleasing part of this is that of the business the "store-door" feature has brought in 95 per cent has been new accounts.

Digitized by Google

Advisory Council Activities Outlined at Banquet

Announcement made of selection of research director. Coffin prize presented to Youngstown Municipal Railway. Transportation problems discussed by A. W. Robertson

A SUMMARY of the activities of the Advisory Council of the American Electric Railway Association for the past year was given at a dinner in the Palace Hotel on the second night of the convention in San Francisco. Nearly a thousand delegates and guests filled the Palm Court and Rose Room. Other features of the evening were the presentation of the Coffin Award and an address by A. W. Robertson.

The meeting was opened by J. N. Shannahan, chairman of the Advisory Council. In speaking on the subject of its activities, Mr. Shannahan reviewed the five years since the Advisory Council of the American Electric Railway Association was organized under the chairmanship of B. C. Cobb of New York. Continuing, he said:

"The members of the Advisory Council represent a large proportion of the nearly six billions of capital invested in the business of providing local transportation service to American communities. The idea in the minds of those responsible for the organization of the Council was that in bringing together these men of large affairs, of wide experience and broad vision, their collective judgment and advice would be of the greatest help in working out the many baffling problems with which the industry has been confronted for a decade. These problems have been materially complicated by the necessity for keeping pace with the growing requirements of modern communities, while at the same time attempting to improve and modernize our facilities to meet new conceptions and new standards of public transportation service on the part of the people whom we serve.

"The men responsible for meeting the demands of the people for adequate, safe and speedy local transportation are alive to their responsibilities, and anxious to so satisfy the riding public by the character of the service they furnish that everyone will acknowledge that such service is in fact an essential, yes, indispensable, need of the community; service of such a character that the car rider will gladly pay such a fare as will enable these companies to compete in the money markets of the world for the funds so necessary to provide these extensions and betterments in which the riding public has so vital an interest.

J. N. Shannahan,
Chairman Advisory Council

"There is no mystery regarding the cause of the change in the public's conception of what it is willing to consider satisfactory transportation service. The rapid and remarkable development of the automobile created new standards of speed, convenience, and even luxury in transportation. This threatened to make obsolete much of the equipment and other facilities of our companies. At the same time, rapidly rising costs of materials and labor made the most rigid economy imperative and prohibited sweeping replacements of physical property.

"But while the public approved the expenditure of vast sums for the construction of streets and highways, without which the rapid development of the automobile would have been impossible, it failed to permit the modernization of public transportation facilities by insisting upon the retention of obsolete franchises, obsolete fare schedules, and obsolete taxes and imposts of various kinds. These have been the basic obstacles to the modernization of public transportation facilities. They have had much the same effect in curtailing the improvement and extension of community transportation as a failure to build roads and to improve streets would have had upon the development of the automobile. As a consequence, public patronage of transportation facilities which came to be looked upon as obsolete and out of date, was rapidly curtailed to merely necessity riding.

"Because the people as a whole agreed to assume the cost of adequate roads and highways, they have made possible the development of the automobile as we know it today and have permitted the automotive business to grow into one of our largest and most important industries. It has become a very important factor in our present industrial structure, and nothing should be done to injure it. When the public understands that obsolete methods of dealing with its local transportation problems constitute the primary cause of many of the difficulties faced by cities of various sizes throughout the country, the way will have been opened to that rapid development and improvement of community transportation facilities which is so greatly needed today.

"For the past four or five years there has been considerable activity on the part of individual operating companies and manufacturers in developing improved type of street cars, suitable for modern traffic conditions and designed to meet the transportation standards of a public whose tastes and transportation standards have been so materially affected by the convenience and luxury of the automobile. The Advisory Council, sensing the need for co-ordination of individual activity in meeting this common problem, at the last convention authorized the organization of a special committee

Digitized by Google

of executives under the chairmanship of Dr. Thomas Conway, Jr. That work has been consistently pressed forward since that time. A careful analysis of the whole car and equipment problem in the industry was necessary before a definite plan could be developed. This, however, has been done and as a result the electric railways of the country are about to launch a co-operative program of research and development, which has long been needed and which, if successful, will be a most important forward step in meeting one of our most acute problems.

"Dr. Conway's committee, after a careful study of the problem, decided that in the selection of a chief engineer to have immediate charge of the work of research and development, it should choose not necessarily a man familiar with the construction of cars nor even with the operation of them, but rather an experienced and competent engineering executive — a man who has demonstrated his capacity to conduct research of large projects and bring them to a successful issue. The committee believes it has found the right man for this work in C. F. Hirshfeld of Detroit, Mich. Mr. Hirshfeld has been for years head of the research department of the Detroit Edison Company. He has had an extended experience in carrying on research work for that company, for the National Electric Light Association, and for other important interests. His is a great task and can only be brought to success with the cordial support and help of all those intimately concerned in the building and operation of the electric car.

"The Advisory Council commends this project to the industry and to the public. Recognizing that there are many street cars in operation today that are badly in need of replacement, it feels confident that the development of designs to meet modern traffic conditions and which will at the same time eliminate much of the popular impression that the street car is an obsolete means of transportation will prove entirely feasible. A group of important railways and large manufacturing companies are backing this project, and it is confidently expected that there will in a relatively short period be available improved types of cars which will make replacements of many existing cars economically practicable."

Mr. Shannahan then introduced the toastmaster of the evening, President Paul Shoup, who again welcomed the delegates from all over the country to the convention and to San Francisco. President Shoup read the report of the committee on the Charles A. Coffin Foundation Award and presented to C. S. McCalla, president and general manager Youngstown Municipal Railway, the Charles A. Coffin Medal and the accompanying check for $1,000.

The address of the evening was made by A. W. Robertson, chairman of the board Westinghouse Electric & Manufacturing Company. Mr. Robertson offered as one step in the solution of the urban transportation problem, the establishment of "transportation districts" for a given community. He urged a closer co-ordination and co-operation between the railways and the various official factions of the area served for the purpose of obtaining better operating conditions under revised franchises and adequate fare structures.

Mr. Robertson further stated that mass transportation is as essential to public service as water, gas, telephone, or any of the other common modern conveniences. For more than a generation street railways have furnished this transportation to our cities. The development of the automobile has reduced the earnings of the transportation companies, but the need of some form of mass transportation is as real as ever. If it were not for the congestion on our streets and the reduction in the number of riders on our street cars, this form of surface transportation might well compare in speed, comfort and safety with any which the world has known, but due to the congested streets and reduced revenue under which the street railway operates, it has to do without many things which the transportation company and the public might otherwise consider necessary.

Many things have been done and are being done to assist the transportation companies in rendering service, but real forward steps cannot be successfully undertaken until the business men, the people at large, and the civic authorities realize fully that the handling of huge masses of passengers in our municipalities is a very complex community problem, and whole-heartedly and constructively co-operate with the local transportation company in solving it. Traffic congestion in our cities not only causes loss and inefficiency to the street car company but also represents a gigantic economic waste to the community. Every city is suffering from its blight. If we can solve the traffic congestion in any acceptable way we solve our mass transportation problems at the same time.

American Executive Committee Breakfast Meeting

REPORTS of several committees of the American Association were presented briefly at a breakfast meeting of the executive committee held on Monday at the Fairmont Hotel. G. C. Hecker, general secretary, presented the report of the publications committee, suggesting that renewed consideration be given to the publishing policy of the association magazine, *Aera*. F. R. Coates told of the gratifying increase in the number of state and sectional associations which have joined the American Association. An outline of the insurance situation was presented by F. L. Butler in the absence of the committee chairman. Leslie Vickers, economist, spoke briefly concerning the work of the committee on taxation. Arrangements for the convention were commented upon briefly by W. V. Hill, who introduced the chairmen of the various local committees which were instrumental in the preparation for the meeting. It was decided, on the suggestion of J. H. Hanna, that a committee should be appointed to study the problem presented by changing conditions in the industry with a view to making corresponding changes in the organization of the association.

W. W. Wysor, president of the Engineering Association, E. H. Reed, president of the Accountants Association and J. H. Handlon, represening the president of the Claims Association, spoke briefly concerning the work of these affiliated bodies. It was decided that the next meeting of the executive committee should be held sometime in August at New York City.

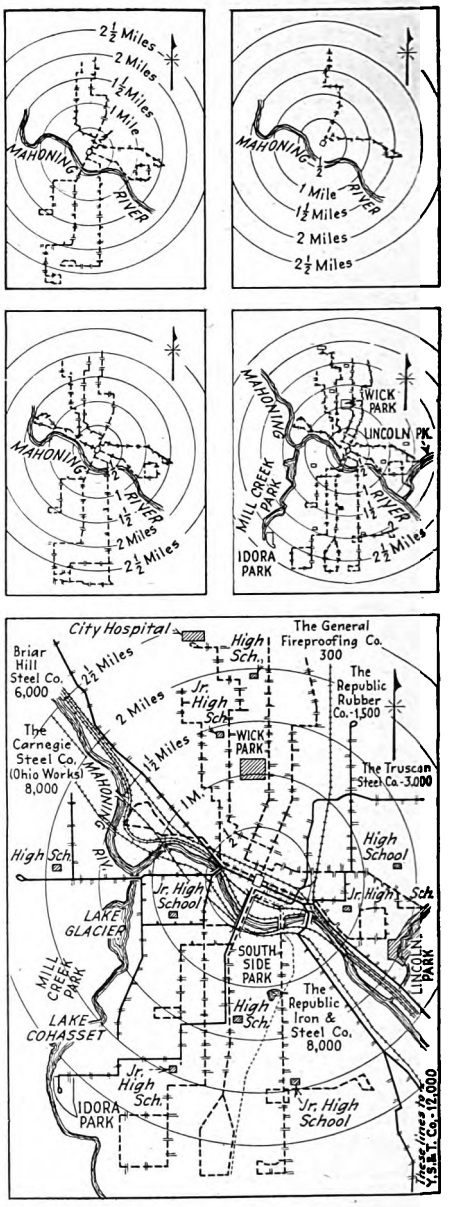
Digitized by Google

COFFIN AWARD Won by *Youngstown*

Modernization of equipment, plant and operating practices, co-ordination of rail and bus services, satisfactory public relations, and co-operation of and with employees mark year of progress. Briefs submitted by six contestants summarized

IN VIEW of its skill in successfully fitting the character and amount of service to the needs of the public and in effectively selling that service to the public, the Charles A. Coffin Prize for 1930 has been awarded to the Youngstown Municipal Railway, Youngstown, Ohio. Five other companies, which submitted a record of their accomplishments during 1929, made noteworthy contributions to the development of the electric railway industry. They are the Cleveland Railway, Cleveland, Ohio; Community Traction Company, Toledo, Ohio; Union Street Railway, New Bedford, Mass.; Eastern Texas Electric Company, Beaumont, Tex., and El Paso Electric Company, El Paso, Tex.

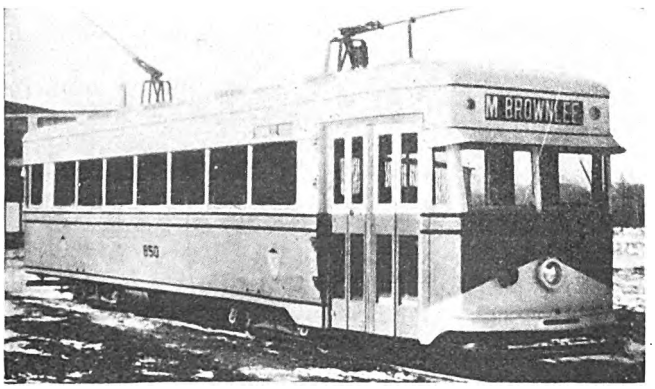
Six principal factors were considered in making the award: more riders and more revenue; friendly public; lower costs and increased reliability of service; increased safety for riders, employees and the public; co-operation between management and employees; and financial accomplishments. Seven electric railways have received this award since its establishment: the Chicago North Shore and Milwaukee Railroad, in 1923; the Northern Texas Traction Company, in 1924; the Pittsburgh Railways, in 1925; the Pennsylvania-Ohio Electric Company, in 1926; the Grand Rapids Railroad, in 1927; the Virginia Electric & Power Company, in 1928, and the Chicago, South Shore & South Bend R.R. in 1929.



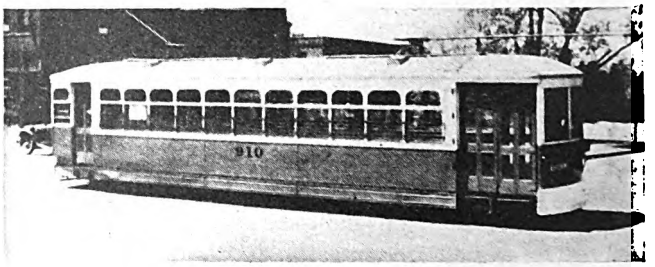
Youngstown is now served by an efficiently co-ordinated system of car and bus routes. The four smaller drawings represent bus lines in 1922, 1924, 1928 and 1929. The larger one the complete system now operated

New Franchise Assures Continued Success in Youngstown

FULL realization of an extensive program of modernization which included a new franchise, new cars and unbroken progress in the standardization of operating methods, materials and economies was the contribution of the Youngstown Municipal Railway, Youngstown, Ohio, to "the development of electric railway transportation for the convenience of the public and the benefit of the industry." This privately owned and operated utility is a part of the Penn-Ohio System which serves the city of Youngstown and suburban territory with an aggregate population of 216,000. Complete co-ordination of street car and bus services has been



A complete program of rolling stock modernization



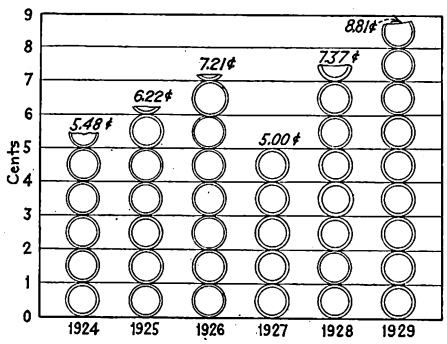
Digitized by Google

Municipal Railway

effected in this territory, the two being used as equivalent vehicles in equivalent service. On this property the bus is not parallel or supplementary.

The new franchise, made final by act of the city government on May 22, 1929, was the outstanding accomplishment of the Youngstown Municipal Railway. The negotiations, in open forum, with the leaders of business, finance and industry of the city resulted in a franchise which not only provides for flexible rate of fares, relief from unnecessary burdens, assurance from competition and genuine co-operation between the city and company in efficiently serving the traveling public, but also provides an arrangement financially satisfactory to the company and affords a basis on which it is justified in spending money for extending and improving its service.

The salient features of the franchise are: complete freedom from all obligations for construction of paving, or paving foundations, except such additional foundations as are necessitated by tracks; complete relief from any obligations for repair of pavement, except repairs actually occasioned by any act of the company; complete relief from all minor exactions such as sprinkling, street sweeping and cleaning, and burdens of this character. The franchise acknowledges the company's right to operate without cost or consideration over all bridges and grade separation viaducts now built and in case of rebuilding said bridges or viaducts, or the construction of new ones, at only such cost as the construction of tracks may add to the cost of the bridges or viaducts; deprives the city of any control over service or fares of the company in case the city should suffer, permit or aid competition with the company, with the exception of existing street railway and taxicab companies and provides that the cost of city control, including salary and expenses of street railway commissioner and his assistants, shall be paid by the city instead of by the company as heretofore.



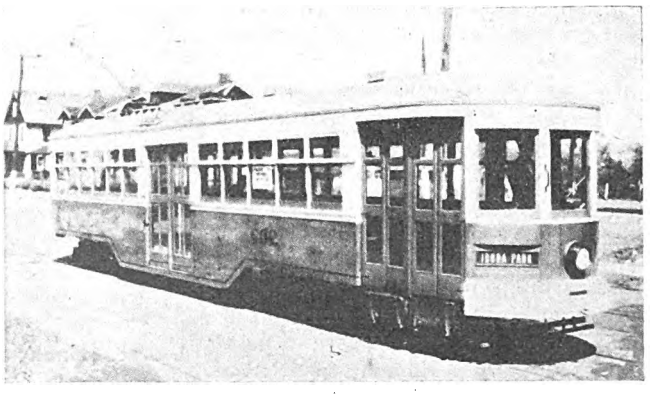
Growth in net revenue in cents per mile before taxes and depreciation

An initial rate of fare of 10 cents cash, six tickets for 50 cents is allowed with provision for increasing and decreasing fares automatically, but with further provision that such sliding scale of fares shall not be impaired by fares other than the sliding scale placed in effect by agreement between the city and the company. Finally, the company shall receive after taxes and depreciation, 6 per cent return on its original capital value and 7 per cent return on all additional capital value, and further, the company shall participate in all excess fares over the rate stipulated to the extent of one-half after a surplus of $100,000 has been accumulated.

During 1929 the Youngstown Municipal Railway acquired thirteen of the most modern cars, of extremely low weight per seated passenger, high-speed motors, double-reduction drive and automatic foot controls. Thus it completed a program under which there does not remain a single street car in use on the property purchased prior to 1917 which has not been fully rebuilt.

The speed of the new cars means cash savings in actual service. The thirteen new cars purchased in 1929 develop an acceleration of 3½ m.p.h.p.s., and unusual deceleration. Advantage is taken of this improved acceleration and braking ability on the main trunk line extending the full length of the city from the industrial plants at Mosier on the west

has been carried out by the Youngstown Municipal Railway



Digitized by Google

side to those of Campbell, on the east side. Through the use of this new equipment 237 car-hours per day, or 6,665 car-hours per year, are saved in giving equivalent service. The actual economy realized through the substitution of this modern equipment is approximated at $80,000 per year.

The net earnings of the company available for taxes and depreciation and after the payment of operating expenses, including the purchase of power, have been steadily on the increase during the past seven years. In 1923 the net income was $250,967 and in 1929, $513,369. This increase is attributed to the constant attention to the popularizing of electric railway service in Youngstown and meeting the competition of private automobiles by improvement in character, speed, comfort, convenience and general attractiveness of the service rendered and by application of merchandising methods in selling this service.

Economies in operation have been effected as the result of original ideas and the application of ideas orginating with others so that revenue per employee has increased, unit revenue has increased, and unit expense has diminished. The largest net revenue in the history of the company resulted in the year 1929. Car and bus changes were reduced, the number of pull-ins cut and a variety of methods and practices resulting in satisfactory service to the public and improved financial returns have been adopted.

The Youngstown Municipal Railway gives evidence of its faith in the continued success of its operations in its plan for the continuance of further development. The budget for 1930 contemplates an expenditure of $543,400. This expenditure is all voluntary and, on a property of this size, manifests the faith the management of the company has, not only in the industry in general, but, under the present conditions, of its future in Youngstown.

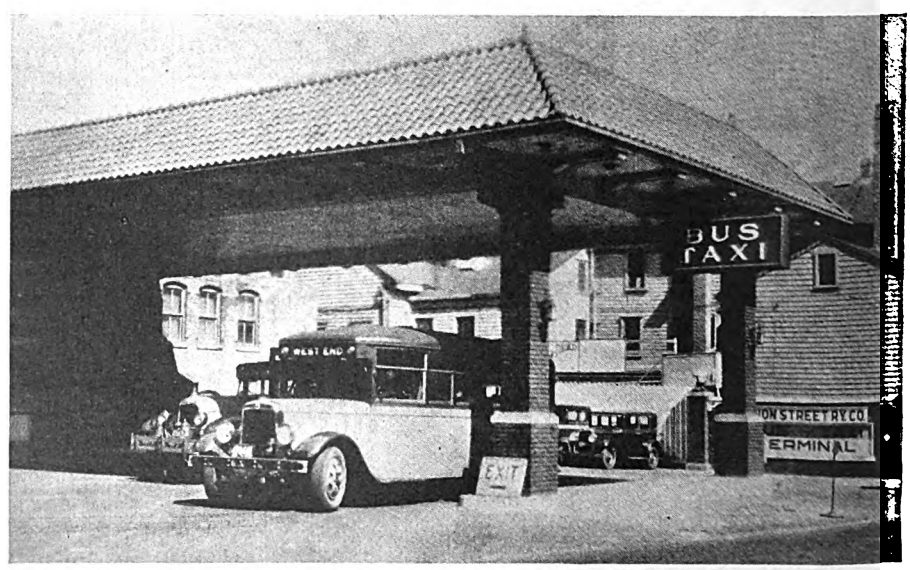
New cars purchased by the Union Street Railway are modern in appearance and equipment

Car, Bus and Taxicab Services Co-ordinated at New Bedford

CONTINUED success in the operation of an old, well-established railway is reflected in the claims made for the 1930 Coffin Award by the Union Street Railway, New Bedford, Mass. Aside from operating the railways more efficiently and economically, the company has benefited from the increased gross revenue obtained from taxicab and bus operations. While these new forms of transportation have been added, operating expenses have decreased markedly.

Comparison of revenues between 1928 and 1929 are reasonable and fair as there has been no refinancing of the company since the last issue of common stock in 1918 and there has been no increase in fares since May, 1927. The story of accomplishments reflecting the results of operating effort during 1929 are as follows: the gross earnings from operations in 1929 were $1,283,221 as compared with $1,286,624 in the previous year. This is a decrease of only 0.2 per cent, so it is fair to state that the gross earnings for the past two years were practically constant; during the same period the operating expenses decreased 3.9 per cent, or from $1,165,964 in 1928 to $1,120,118 in 1929; the operating profit after depreciation increased 35.1 per cent, an increase of $42,442; the depreciation rates in 1929 were not decreased over those used in 1928; the net operating profit, after interest and taxes, increased 71.9 per cent, or from $50,733 in 1928 to $87,223 in 1929 and the credit balance of the company was increased 6.2 per cent.

For a number of years the Union Street Railway has maintained a traffic department which devotes the greater part of its time to analyzing riding requirements and making time-tables to meet the needs of the public. Not only has this given service where, when and as required, but it has been the means of saving thousands of dollars by eliminating unnecessary service. During 1929 this department functioned in such a way as to make it possible for the company properly to segregate its various classes of service. The following figures show the results of this work: 18,108 miles of bus, trolley and taxi operation were saved over the previous year's operation, or 0.1 per cent; receipts per car-hour increased from $3.46 to $3.47, and receipts per car-mile from 40.17 cents to 41.04 cents. The decreased mileage



A large, centrally located bus and taxi terminal has resulted in more efficient operation of the two services

Digitized by Google

was due to increased schedule speeds, service adjustments and bus co-ordination, resulting in increased receipts per car-hour and per car-mile.

Practically all existing rolling stock has been rebuilt and remodeled into modern one-man cars. Modern de luxe interurban cars have been put in operation on the line between New Bedford and Fall River. The entire complement of older street cars has been kept in excellent condition and a series of new cars were purchased in 1918, in 1923 and in 1929. The latter cars are of the most modern type equipped for one-man or two-men operation. They resemble the automobile to some extent, the body being painted to produce the streamline effect. The cars provide seats for 44 passengers, and all seats are covered with leather upholstery. All mechanical equipment is automatic and is concealed from view. The windows are especially wide so that regardless of where a passenger is sitting he has a clear view outside. The cars weigh 17½ tons and are equipped with four 35-hp. motors. Fast accelerating and braking rates are attained.

An example of proper co-ordination between street car and bus is found in the service between New Bedford and Fall River, Mass., and Providence, R. I. The service, inaugurated in 1925 by the Union Street Railway, competed with the company's existing trolley lines that operated between New Bedford and Fall River, Mass. The rate of the fare charged on the buses is 50 cents between New Bedford and Fall River, and $1 between New Bedford and Providence. The motor trip between New Bedford and Fall River takes 40 minutes. The trolley fare for a ride between New Bedford and Fall River is 30 cents, and the running time 50 minutes. In these two services, patrons have the choice of the speed and rate of fare they desire. No local stops are made by the bus, while the street car accommodates all local patronage en route. The result of this co-ordinated service shows that the combined gross revenue of both trolley and bus operations has more than made up for the loss of trolley revenue. Decreased trolley patronage has made it possible to effect a decrease in street car expenses.

During 1929 the company purchased a large, centrally located gasoline station, which, in addition to having a large amount of land, had a permanent canopy extending over most of its property. It was possible to park several buses at a time under this canopy, and to accommodate the entire taxicab fleet on private property in front of this taxi and bus terminal.

The taxicab service performed by this company is based on its reputation for reliable, convenient and comfortable service. Taxicab fares are based on flat rates because of independent competition, but the company has been able to do a good business in spite of the fact that other long established companies charge rates nearly one-half of what the railway charges. Telephones are located throughout the city and have been used for a number of years by the railway inspectors and starters. By using these telephones, the taxicab drivers eliminate a great deal of dead mileage.

More Passengers and Fewer Accidents at El Paso

Timely advertising has resulted in increased riding in El Paso

HANDLING passengers of whom more than half are foreign born, serving two countries with dissimiliar laws and customs and increasing passengers and revenue, marked the accomplishments of the El Paso Electric Company for the year 1929. This company serves the transportation needs of El Paso, Tex., and Juarez, Mexico, as well as a large U. S. Cavalry Post at Fort Bliss, the municipal airport and a new industrial center.

THERE are approximately 141,900 people in this service area which are served by 80 passenger street cars, four work cars and fourteen buses, operating on 48.52 miles of equivalent single track. No rail extensions were made during the year, but additional co-ordinated bus routes were established to supplement street car service. The principal factors contributing to improvements are measures that have been responsible for both increased efficiency and added economy.

The operating revenue in 1929 was greater than for any year since 1921 when El Paso's normal population was augmented by some 60,000 or 75,000 soldiers concentrated for demobilization following the World War. The gain in gross receipts was $60,988 or 7.2 per cent above receipt for 1928. Street cars and buses carried over a million more revenue passengers in 1929, an increase of 5.82 per cent over the previous year.

Broadly speaking, the marked improvement in earnings made has been

Digitized by Google

brought about by the speeding up of service, through the intensive sales efforts carried on throughout the year and by accurately fitting service to conditions. Speeding up of service was the result of faster schedules and closer supervision. A considerable portion of the rolling stock is new while the older equipment has been completely remodeled and includes the latest improvements in operating comfort and convenient details.

Merchandising plans carried out fully have embraced all the popular practices as well as many that are novel and which have been used in El Paso and Juarez with unusual success. The operators have been trained in courtesy, in safety, and in skillful salesmanship. Sales efforts have included house-to-house canvassing backed by the liberal use of newspaper advertising, pamphlets, inside car cards and various other mediums. The methods used to sell car rides incorporate credit sales of ticket books, department store cards, special service and other novel ideas.

One of the outstanding accomplishments of the El Paso Electric Company for 1929 was a further reduction in accident costs. Within the five-year period from 1921 to 1926 inclusive, this company effected a reduction in accidents equivalent to 76 per cent, as well as making other remarkable improvements in safety. In 1921 the company was experiencing 8.83 accidents per 10,000 car-miles which was reduced to 1.42 accidents per 10,000 car-miles in 1926. This low ratio was maintained until 1929 when a further substantial improvement was made with a further reduction of 68 per cent in the settlement of claims, suits and judgments. The amount paid in settlements during 1928 was $29,374 as against $10,402 for 1929. Safety contests, first aid demonstrations, honor roll systems, safety banquets and similar measures were used to maintain interest in accident reduction.

An excellent record for economy and efficiency in the maintenance of equipment has been made in the past and further carried on in 1929. Modern methods, original devices, improved practices and better facilities together with a highly skilled personnel have all contributed in this phase of operation. Particular attention has been paid in the recent past to the establishment of an upholstery department and the adoption of a centralized system for reclaiming scrapped material.

Large savings are reflected in improved construction methods as well as better maintenance practices. Original plans for track paving and similar measures have produced improved operating results at reduced costs. After a careful study of the different types of tracks and construction the El Paso Electric Company has standardized on a 90-lb. A rail, steel ties, crushed stone ballast and concrete pavement.

Concentration upon the concrete pavement is a measure of economy practiced in construction worthy of note. This, in general, is one-course construction, but in heavy traffic intersections or under other special conditions it is two-course construction, consisting of a rather lean base (1:3:6) and a granolithic surface of a much richer mix resembling a good sidewalk coping. For both, the company insists on a dry mix of good workable consistency. It has trained its crews to the point where the costs are way below that of the local paving companies and in addition it gains the most desirable end, that of having the entire job under its control.

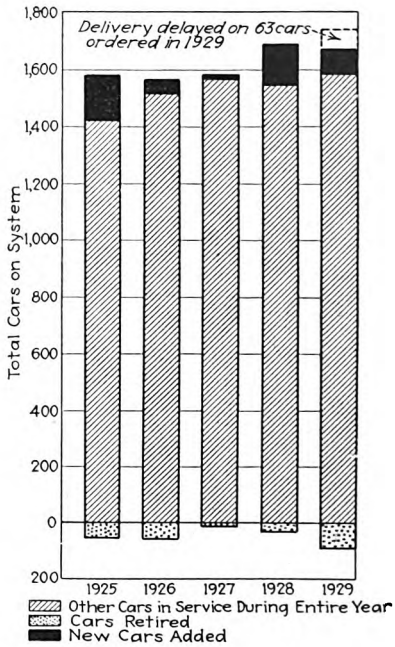
The construction program for 1929 called for a larger investment than that annually required for the past sixteen years. It included construction of a new power plant, a substation, a connecting transmission system and installation of equipment in the old power station necessary for the utilization of natural gas as fuel. The company also built a new reinforced concrete and steel bridge over the Rio Grande River to replace the old wooden structure.

In order to retire existing floating indebtedness and to finance the major portion of the construction program, $4,000,000 of 5 per cent bonds were issued in addition to the bonds already outstanding under a mortgage dated June 1, 1925. The bonds were sold to a syndicate of brokers for offering at a price of $95 to yield 5.40 per cent to maturity. The net to the company was $91. After discount and other expenses incidental to the issue, the net cost of this new money to the company was approximately 6½ per cent. This financing reflects a rather outstanding achievement since it was necessary to float this issue in June during a highly speculative market.

Cleveland Railway Pioneers with New Cars and Maintenance Equipment

FOREMOST in the Cleveland Railway's 1929 program to popularize electric railway service and to meet the competition of private automobiles was the purchase of 100 new single multiple unit control type of cars, following a purchase in 1928 of 50 new single-unit and 28 articulated trains. These 206 cars have given to the Cleveland public considerable convenience and generally attractive service. They have been designed for high rates of acceleration and therefore will function well in securing high speeds when schedules are revised as a result of transportation research.

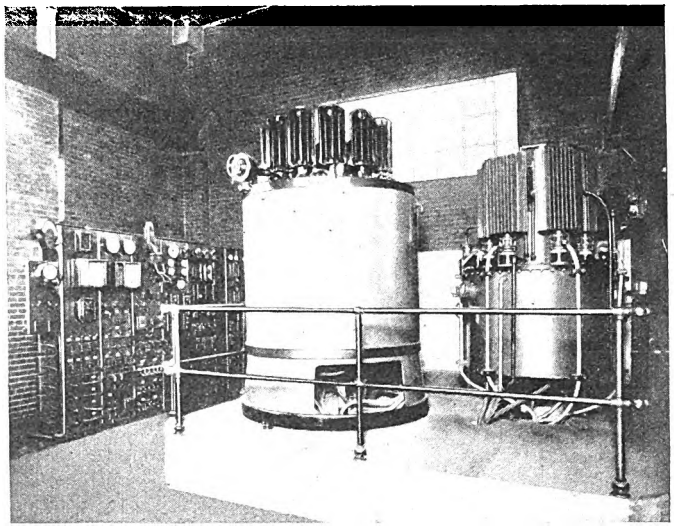
Cleveland pioneered the aluminum car for street railway use. It was built to demonstrate the durability of this material and that lightness could be obtained without sacrificing strength. The substitution of aluminum for steel reduced the weight of the car 12,900 lb., or 29.9 per cent. Its weight is 30,300 lb. as compared with 43,200 lb. Actual power saving per car-mile is 15.3 per cent. Aluminum was substituted for steel wherever possible. The superstructure, conduits, fenders, ventilators, couplers, trucks, compressors,



The purchase of new cars is a continuous policy in Cleveland

Digitized by Google

Interior view of aluminum car with which Cleveland Railway has been experimenting



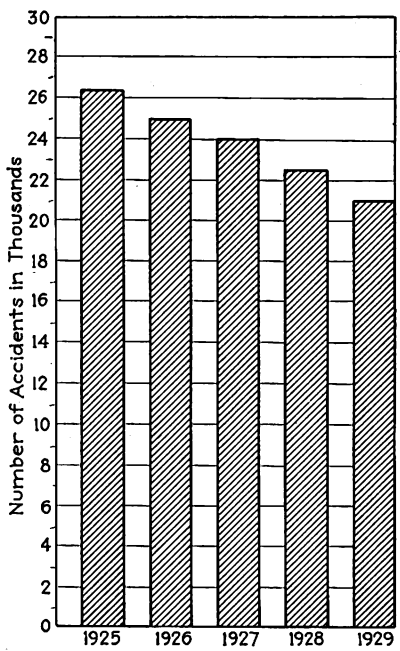
The Cleveland Railway is studying the mercury arc rectifier and its application to service conditions

brake cylinders, brake rods and bolsters were made of aluminum. Wheels, axles and motors, with the exception of bearing housings, remained steel. This car was put into regular service Jan. 1, 1927, and has been in constant use since that time, operating an average of 2,200 miles per month.

Recognizing the need for coordination of all transit facilities in the city of Cleveland and surrounding territory, the Cleveland Railway has co-operated with the rapid transit interests in developing a terminal plan around the public square. This plan will focus the principal industrial, business and banking activities at this central point and will provide an easy interchange of passenger traffic between main railroad trunk lines, the rapid transit system, the surface rail and bus system, taxicab service, private automobiles and pedestrians.

More riders and more revenue were obtained when the Cleveland Railway made a profitable substitution of a motor coach line for an unprofitable street car line. Flexibility of the motor coach not only permitted necessary rail abandonment, but also secured service extensions. This new express service from Cleveland Heights to Public Square, a distance of 7.92 miles, is attracting the previous user of the privately owned automobile. It is making a steady customer of a former occasional user of the Cleveland Railway Transportation Service. The earnings under the fare of 25 cents are averaging 30 cents per mile.

With the incentive to produce the very best service at the lowest possible fare and the lowest cost, the Cleveland Railway has continuously developed new equipment, machinery and methods. The automatic substation and remote control system first applied to metropolitan service in Cleveland has resulted in a continuous system power supply which has experienced no interruption on the system as a whole in over five years. This company not only conceived the idea of applying the automatic substation to metropolitan operation but actually specified and assisted in developing the equipment necessary for the operation and control. In the early development of a 60-cycle a.c. transmission system, there was no synchronous converter equipment available, and realizing the advantages of purchasing power from the existing 60-cycle central station rather than building a 25-cycle plant, the Cleveland Railway, after extensive investigation, undertook to design the first large capacity unit, namely, the 1,500-kw. size. With this machine they blazed the path for large capacity with 60 cycles. While it was a success from the start, the company has continued to improve its operation down to date.



Accidents are showing a steady decline in Cleveland

The possibility of applying the mercury arc rectifier to a metropolitan 600-volt power system has been carefully studied by the Cleveland Railway, and experimental installations have been made in co-operation with manufacturing companies. These experiments have included the application of automatic control, the super-imposition of remote supervisory control and the necessary changes to adapt the device to parallel operation with a synchronous converter in the same plant, and the development of means to overcome interference with telephone circuits. The original experimental units have now been replaced by the most recent development, consisting of a 500 and 1,000-kw. unit. As a result of these experiments, it is expected to ascertain how the mercury arc rectifier can be best applied to service conditions.

The Cleveland Railway has been a leader in the development of labor-saving machinery and equipment designed to reduce cost of operation. The shop, tracks and maintenance departments have all benefited from this progressive policy of developing new devices.

The Cleveland Railway has proceeded with its own safety program from an analytical standpoint to de-

Digitized by Google

termine the basic causes of accidents, having in mind the establishment of safe practices without affecting speed Reduction of costs of injuries and damages has been the result of this study. In addition to this encouraging financial success, the extensive first aid instruction has caused the employee to sense the economic aspects of accident prevention. All transportation accidents show a study. In addition to this encouraglast five years.

Because it recognizes that profitable public relations depend largely upon the trainmen, the Cleveland Railway has centralized all industrial relation functions such as job analysis, selection and training of employees, accident prevention, public relation activities, suggestion systems, insurance and pension plans and welfare activities. This unusual centralization has resulted in an organized program of strengthening the trainmen's morale and inaugurating an intensive sales effort as a specialized activity of the company's personnel department.

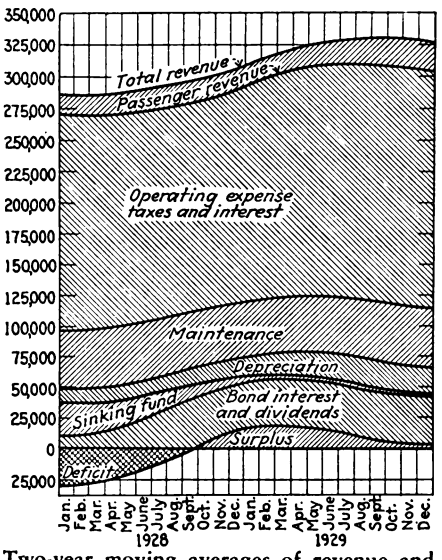
Other results have been improved employee relations, and the process of the employment interview, together with its public relation phase; standardized grading of applicants; standardized ability tests, and subsequent training. The aim is the training of specialized salesmen to enter a highly competitive market in which the company has at stake a million sales per day.

Services Modernized and Co-ordinated in Toledo

SUCCESSFUL co-ordination of street car and bus operations, permitting the extension and improvement of service with little new capital, is submitted by the Community Traction Company as its outstanding accomplishment in 1929. An increase in riding of 5.25 per cent and of passenger revenue of 5.35 per cent in contrast to an increase in average of employment of only 2 per cent was gained on the basis of better service because there was no change in company fares and the present franchise permits no opportunity for trials of special ride-selling fares. That the company kept pace with this increased patronage is shown by the fact that there were nearly 1,000,000 more service-miles operated in 1929 than in the previous year, an increase of 11.62 per cent.

A terminal-to-terminal speed increase of 22 per cent was made possible largely by rescheduling various car lines after increasing the horsepower per car from 70 to 140 and by rearranging the stops. This result was obtained during the greatest street reconstruction program in the history of Toledo.

Bus service was developed to a high degree with special attention to peak-hour industrial short-cut routes, schools, replacement of steam shop trains, door-to-door delivery of night workers, extensions to outside industries, guaranteed operation for suburbs and chartered service.



Two-year moving averages of revenue and expenses show progress in Toledo

The reduction in railway route mileage and the remarkable rise in motorbus routes does not in any way indicate the early demise of Toledo's street cars. Proper coordination of these services has strengthened the operation. The trunk line street car routes, particularly on the wide improved streets, have been rejuvenated to carry still heavier loads. On the other hand, the bus has been used to replace the slow, weak-traffic, single-track routes of narrow streets, to take up the loads of the non-competitive portions of old duplicative routes, to develop new crosstown routes for expanding and relocated industries, to serve as feeders and "owls" of street car routes and finally to create a variety of chartered daily and casual services made possible by the flexibility of the bus.

Traffic studies and new scheduling practices have resulted in better use of mileage. Former practice provided a certain number of base vehicles to run from 5 a.m. to midnight. Additional service was provided during the intervals, from 5 a.m. to 9 a.m. and from 3 p.m. to 7 p.m. This arrangement gave too much service just before and after the peak, yet not enough service at the peak.

A definite humanizing of employee relations has been continued during 1929. Comfortable working quarters and shopmen's uniforms have been supplied. Athletic and musical organizations have been fostered and economic matters, such as the treatment of veteran employees, of the superannuated, sick and injured, and of the families of deceased workers, have been furthered. All this work was done with the restriction imposed by the service and cost operation of a union property.

Two renewals of wage agreements have been made—the first in June, 1928, with no changes in wages except adjustments for some shopmen, and the second in June, 1929, when trainmen's wages were raised 2 cents an hour plus 1 cent an hour additional to each man who has a "No Accident" month. Further evidences of proper relations between management and employees are found in the growth of one-man operation and the selection and retraining of electric operators for bus service.

All financing, with the exception of the five-year way reconstruction program, has been done out of the earnings and on unsecured loans from local bankers. One of the most notable examples has been the fact that the extensive motor bus development of Toledo has been built up without any new capital. Buses are acquired on a rental basis, involving monthly payments over a period of years. Thus the buses can and do, in their entirety pay for themselves directly out of their earnings. The only buses that appear in "plant accounts" are those taken from the independents. Profits from operations which comprise any money remaining after expenses and rentals are assigned to "general surplus." To this "general surplus" will also be assigned whatever turn-in value the buses may have.

Digitized by Google

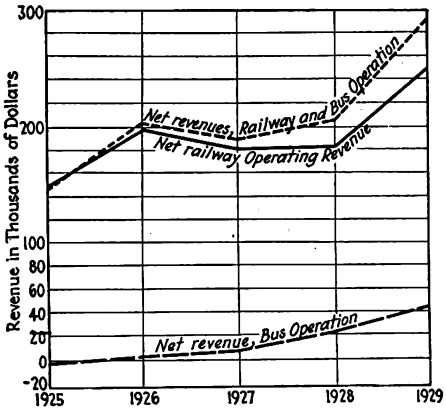
Gross and Net Increased by Eastern Texas Electric Company

POSITIVE evidence of progress, written in terms of greater gross and net revenue, is given by the Eastern Texas Electric Company in a statement of accomplishments for 1929. Serving a total population of approximately 116,000, this company furnishes street car and bus transportation in the cities of Beaumont and Port Arthur, Tex., and operates an interurban car line between them.

Local transportation has been furnished by the Eastern Texas Electric Company in Beaumont since 1912 and interurban service to Port Arthur since 1913. The successful operation of these systems, together with their progressive attitude in civic affairs, has built for them an enviable reputation. This reputation led the citizens and business interests of Port Arthur, acting through its city administration to petition the Eastern Texas Electric Company to take over the failing system in that city.

After a very thorough investigation of the situation, this property was purchased and a program of complete rehabilitation put into effect. Within the short course of slightly more than a year a property with worn out tracks, patched-up network for overhead, junk for rolling stock and ill-will instead of good-will was rendering a modern service and was put on a sound operating basis. The results speak for themselves. Gross revenues were increased from $6,023 in February, 1928, the first full month of operation, to $21,397 in December, 1929. In this latter year the property made a net earning of 16.8 per cent on the capital invested.

Accomplishments on the property as a whole, considering the two local services and the interurban line, can further be told with more figures on net revenue. Operating revenues for the year 1929 have been increased 18.8 per cent over the preceding year, while operating expenses only increased 8.2 per cent. Net revenues after taxes show the remarkable increase of 65.5 per cent. The railway department increased operating revenues 13.1 per cent, while increasing the expenses only 1.8 per cent. Net revenues in this department were increased 37.8 per cent over 1928. The bus division likewise showed a substantial increase in operating revenues amounting to 48.9 per cent with increased operating expenses of only 38.9 per cent. The net bus operating revenues are 80.7 per cent higher than in 1928. Since 1925, earnings in the railway division have increased 2.11 cents per car-mile, while operating expenses were decreased 1.37 cents per car-mile, leaving an increased net rate per car-mile of 3.48 cents.



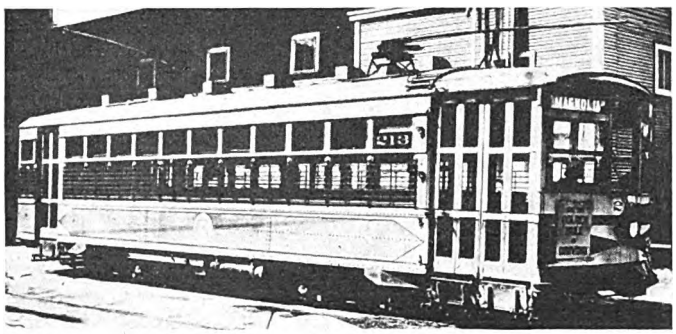
Efficient operation and aggressive merchandising have resulted in greater net revenues for the Eastern Texas Electric Company

Operation of buses began on this property in 1924, and showed a net loss of 8.76 cents per bus-mile. In 1929, this figure had been turned to a net profit of 6 cents per bus-mile. Earnings on invested capital in 1929 amounted to 10.2 per cent. Net income was increased $88,625 in 1929 over 1928, and this increase amounts to 6.8 per cent on the corporate capital stock.

The company's invested capital account increased $467,000 since 1926 and this includes the funds necessary for acquisition and the improvement of the Port Arthur property. The capital for this expansion was secured through temporary borrowings and all but $145,000 has been repaid out of earnings. Net additions to invested capital accounts during the past three years were returned in a period of eighteen months on the basis of 1929 operating revenue. Net additions to invested capital accounts during 1929 were returned by increased operating revenue in a period of 6.4 months. In addition to repaying a substantial proportion of the money borrowed for expansion, the company has paid stock dividends at the average rate of 6 per cent yearly.

Confronting the Eastern Texas Electric Company in 1929 was not the problem of rebuilding a rundown property or of building up good will which had been destroyed, but rather a problem of increasing a patronage that had in the past been gratifyingly satisfactory and of improving public relations that, throughout the long history of the company, had been above average. This problem could only be solved by thorough and efficient merchandising. Modernization of equipment as well as that of tracks and their maintenance played an important part in this program. That the rolling stock was kept in good operating condition is attested by the fact that the railway equipment during 1929 operated 52,400 miles and the buses 3,332 miles to every pull-in.

As a requisite to success in merchandising the service, the operating personnel took a place of equal importance with modern equipment and convenience, locations of lines and adequate schedules. The company's policy is to employ platform men who are not over 28 years of age. They are carefully selected and trained not only in the work which they are to do but as salesmen of the company's service. The men are urged to live in different portions of the city for the possible good to be attained through association in scattered neighborhoods.



Modern equipment is used on city and interurban lines in Beaumont and Port Arthur, Tex.

Digitized by Google

Round-Table Discussions Held on Many Subjects

TEN luncheon conferences were held at the San Francisco convention of which three were in connection with the work of affiliated bodies. The other seven were on general topics. Much valuable discussion developed at all of them. Brief reports are given below or elsewhere in this issue.

Relief of Street Traffic Congestion

NEED for scientific methods of locating traffic signals and the effects of parking regulations were the principal subjects discussed at the luncheon conference on "Relief from Traffic Congestion." In the absence of G. A. Richardson, E. J. McIlraith, Chicago Surface Lines, led the discussion.

R. T. Dorsey, city traffic manager, Los Angeles, questioned the possibility of setting up a minimum standard code for the location of traffic signals based on the number of vehicles passing a given intersection.

Some divergence of opinion was evident on the subject of manual operation of traffic signals by police officers. Mr. McIlraith held that manual operation is never as satisfactory as properly timed automatic control, while E. L. Byington, chief inspector Market Street Railway, San Francisco, stated that local conditions have sometimes made necessary manual control on Market Street during peak-load periods.

In reply to an inquiry by E. C. Mitchell of the Los Angeles Retail Dry Goods Association, Mr. McIlraith summarized the history of no-parking legislation in Chicago and pointed to the present agitation for parking restriction on the part of merchants on Milwaukee Avenue as concrete evidence that the parking ban in the central business district has proved its merit.

E. F. Thayer, St. Louis Public Service Company, pointed out the real service which local transportation people can render to the downtown merchants of their communities by working to convince them that their own ultimate salvation lies in taking a constructive attitude toward the street traffic and parking problems. He indicated the analogous situation between the former adverse attitude of merchants toward the by-passing of through traffic and the present unwillingness to listen to suggestions that curb parking in front of their stores be eliminated and the streets reserved for traffic movement rather than used for garaging space.

The advantages of staggered office and store hours and the merits of taxicab stands as compared with unlimited cruising were also discussed.

Others taking part in the discussion were R. T. Dorsey, city traffic manager of Los Angeles, Ralph Robinson, manager of the San Francisco Traffic Survey Commission, and James Davis, deputy chief of police of Los Angeles.

Fare Structures

SUMMARIZING the present situation on fare structures, A. S. Richey, Worcester, Mass., who presided at the luncheon on this subject, pointed out that flat fare increases have not proved entirely satisfactory. However, while exact theoretical fare structures could be worked out it would be impossible to put them in practice. There are three difficulties, he said, which prevent exact fare systems working: to determine the exact fare due from each individual passenger; to collect the fare without slowing up the service; and to audit it. When and if such problems can be solved, the proper fare structure will be in sight. In the meantime, many interesting experiments in fare structure are being made.

J. G. Hunter, transportation engineer California Railroad Commission, felt that if a 5-cent base fare is retained it is necessary to go to zones. He has grave doubts as to whether high fares will do any good, at least under conditions existing in California cities.

G. H. Binkley, Market Street Railway, San Francisco, stated that on his property, while the 5-cent fare is not satisfactory as a revenue producer, he questions whether an increased fare would be helpful. A. S. Tilestone, Key System Transit Company, Oakland, stated that his company is now charging 7 cents, excepting that an all-day pass is used on Sundays and holidays. This has proved profitable, he said, and has brought in some additional revenue. Frank Karr, Pacific Electric Railway, Los Angeles, mentioned various changes made in fare rates.

H. S. Dixon, San Diego, said that the fare structure in that city features two city zones, inner and outer. In each there is a 5-cent flat cash fare with tokens good for two zones sold at the rate of four for 30 cents. Some of the suburban routes have as many as ten zones with a fare of 5 cents in each and with reduced rate tickets. There also is a weekly pass on the system sold for $1, which is good in either inner or outer zone, and a school pass restricted to school districts. The pass, he said, has made possible one-man operation, as it is used by one-third of all the passengers.

W. W. Holden, San Antonio, described the service zoning in that city. All street car lines are cut off at a 3-mile radius from the center. There is a second zone 1½ miles wide outside of that and other zones are beyond. In the outer zone, buses are operating which run express through the inner zone. This automatically segregates the passengers into social groups, which he has found helpful. The service is speeded up in the outer zones about one-third. It has made it possible to give improved service without increase in equipment.

R. E. Moody, Milwaukee, discussed the new fares in effect in that city. These include 10 cents cash with reduced ticket fare and pass. The pass, he said, is well liked. In St. Louis there is a modified permit plan. A card good for twelve rides is sold for $1. This is punched by the conductor each time a ride is taken, and after it has been punched

Digitized by Google

twelve times it is accepted on payment of 5 cents a ride.

L. R. Nash, Boston, summarized the discussion. He indicated that with service such as that given in San Antonio it is necessary to have a sufficient demand to give reasonable headways in each zone. The nickel permit, he believes, has advantages over the weekly pass, in that it distinguishes between casual and regular riders.

Employees Relations and Trainmen Conference

AN ACTUAL trainman's conference with thirteen motormen and conductors, under the direction of T. A. Bragg, superintendent of training and employment, Market Street Railway, San Francisco, was held before approximately 60 delegates at the luncheon on employee relations. The trainmen represented employees who had been in street railway service from 8 to 29 years. The total number of years represented by the entire group was 231. Mr. Bragg announced to the group that the subject for their consideration would be, "Interesting the Customer." The men, asked to analyze this subject, took up the various elements in obtaining more rides from the public.

A further question was asked the group about getting back the rides that have apparently been lost due to automobile and other competition. It was unanimously agreed by these representative trainmen that they should go out and solicit new business. Door-to-door canvassing and merchandising methods were discussed.

Following this demonstration, Edward Dana, general manager Boston Elevated Railway, sponsor for the luncheon, expressed his appreciation of the conference held and told of similar methods of employee contact being carried out in Boston.

Transportation Problems of the Small City

IMPROVED and intensive merchandising methods, accompanied by the best possible service that can be rendered, are the greatest needs of the transportation systems in small cities, according to those who gathered for this conference, which was in charge of F. L. Butler, vice-president Georgia Power Company.

In his opening remarks, Chairman Butler emphasized the importance of the small-city problem and the necessity for taking immediate steps to place them on a sound operating and financial basis. "Any community," he stated, "that expects to expand and prosper necessarily requires some form of dependable and economical public transportation."

The report of the committee on small-city operation, not presented at the regular T. & T. sessions, was read at the luncheon conference by Mr. Butler. The report is summarized elsewhere in this issue.

In the discussion which followed, the subjects of bus substitution, transferring from car lines to feeder buses, selling the service, employee sales campaigns, radio, new equipment, one-man operation, public relations, fares and market surveys were covered.

Those who participated included C. B. Short, Roanoke Railway & Electric Company; John H. Pritchard, Central Public Service Corporation; E. W. Florence, Pacific Gas & Electric Company; A. C. Bradley, Pacific Electric Railway; W. N. Clark, Southern Colorado Power Company; W. H. Heun, Chicago & Joliet Electric Railway; Maxwell E. Benson, Nashville Railway & Light Company; R. E. Plimpton, White Company; and A. H. Gossard, Middle West Utilities Company.

Interurban Management and Operation

DISCUSSION at the round-table luncheon on interurban management and operation, sponsored by D. W. Pontius, centered around plans for recovering the transportation business lost by electric roads. Of particular interest was the discussion of the store-door pick-up and delivery system inaugurated by the Pacific Electric Railway in southern California a year ago. Under this plan the railway company contracts with trucking agencies at terminals and important stations along the line to perform the pick-up and delivery service. Mr. Pontius stated that this service has doubled their business without loss of their former traffic.

It was the consensus of opinion of all those who discussed this important subject that store-door delivery offers the most promising solution.

Development of Cars and Equipment

GOOD vehicles are essential to good public relations and there is no more important problem before the electric railway industry today than the development of improved cars. Unanimous agreement on this point was evident from the discussion at the "car development" luncheon under the sponsorship of Dr. Thomas Conway, Jr., president Cincinnati & Lake Erie Railroad. He stressed the need of organizing the mechanical men of the industry to secure the benefit of their ideas and experience in the work of the President's Conference Committee. The electric railway as a business undertaking cannot survive unless it can be put on a profitable basis, he said, and the key to the situation is the electric railway car.

Enthusiastic support of the program of the committee was expressed by C. C. Vargas, Key System Transit Company, Oakland, Cal.; J. M. Yount, Market Street Railway, San Francisco; E. B. Meissner, St. Louis Car Company; George Frey, J. G. Brill Company, and C. E. Morgan, Cincinnati Car Company. Mr. Meissner also emphasized the importance of developing methods of financing new car purchases. Prof. D. D. Ewing, Purdue University, prophesied that much good would result from the concentrated research work now being undertaken. Recent experience with new cars in Chicago was outlined by H. H. Adams. That people can be induced to ride only by making the vehicles attractive was the opinion expressed by G. J. Shave, of the London General Omnibus Company.

In connection with the problem of improving rolling stock, a lively discussion occurred concerning depreciation reserves and their effect in making possible the purchase of new cars. W. G. Rennison, Petaluma & Santa Rosa Railroad, spoke of the difficulty which many railways have in setting up adequate depreciation reserves and doubted that it would be possible to depreciate new cars on the basis of a ten-year life as has been suggested. Richard Sachse, Key System Transit Company, and Dr. Conway expressed the opinion that the railways would be allowed to set up depreciation on the basis of the actual useful life of equipment regardless of whether it was more or less than ten years.

Digitized by Google

Co-ordinating the Taxicab

THAT there is a place and a need for taxicab service which should be furnished by the existing transportation companies provided adequate legislation is enacted was the conclusion reached at a luncheon meeting under the sponsorship of J. B. Stewart, Jr., of the Cincinnati Street Railway.

Electric railway traffic has been seriously affected by the increasing use of taxicabs, particularly in certain cities where the cut-rate taxi business has developed into a situation resembling that created by the jitneys some ten years ago. Mass transportation agencies should be protected against unfair competition of this character, he said.

F. W. Doolittle, of the North American Company, suggested that the railways have been making a mistake in failing to recognize the demand for other classes of service than that rendered by their mass transportation vehicles. O. C. Mills, Key System Transit Company, contended that electric railways cannot go into the taxicab business until more adequate regulation is enacted. The bad effects of low-rate taxicab operation in Columbus, Ohio, were discussed by M. L. Evans, Columbus Railway, Power & Light Company. He said, however, that the general public and the merchants are now beginning to resent the manner in which these cabs are congesting the streets. Conditions in Cincinnati were described by Mr. Stewart.

Development of Buses and Trolley Buses

INTEREST in rail-less transportation centered around a discussion of design, construction, reliability of service, and the riding comfort of the different types of vehicles available at the luncheon meeting on "Development of Buses and Trolley Buses," sponsored by E. A. West, Salt Lake City.

Particular attention was given to the features of trolley bus design and operation, especially the high rate of acceleration and retardation and the effect on tire life, which was said to be negligible.

Trolley bus operation was held to be more economical than that of gas buses as the saving in energy costs, even on a fifteen-minute headway, was sufficient to meet the cost of erecting the overhead wires.

In the discussion of motor buses, trouble from gas fumes was held to be one of the biggest complaints. This difficulty was attributed both to design and to the fault of the fuel refiner.

Small-sized buses—those of 21-passenger capacity—were cited as being of especial value for fast schedules and that speed depended on number of stops necessary to handle the traffic. With twenty seconds as the time for taking on and discharging a passenger, schedule speeds are slowed down in direct proportion to the capacity of the bus operated. Thus if 21-passenger buses can make a schedule in 30 per cent less time the cost per seat-mile will be about the same for both buses of large and small capacity. This higher speed is of real sales value. In San Antonio, it is said, complaints are now being received from automobile drivers that buses travel so fast they cannot be passed.

Comments were also made relative to the high cost of replacement parts for some types of units used on buses, of the necessity for providing greater accessibility of parts for proper maintenance and more simplicity in body construction in order to lower maintenance costs.

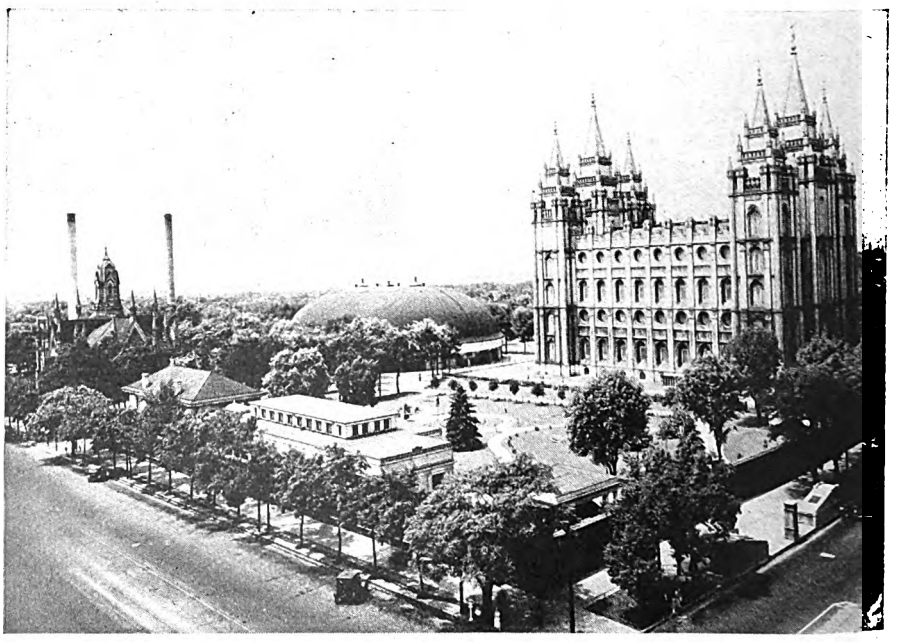
Claims Luncheon

MATTERS involving the handling of claims were discussed in detail at this conference, in charge of B. F. Boynton, advisory claim agent of the Northwest Public Service Corporation, and president of the Pacific Claim Agents Association. Most of the discussion concerned the ambulance-chasing evil which is now so prevalent throughout the country. This subject has been before the Claims men in the past in a notable series of presentations, and evidence of real progress toward curbing the evil was furnished. In New York particularly has success attended efforts to curb the "shyster."

A feature of the luncheon was a paper on "The Psychology of Accident Prevention," read by L. H. Rodebaugh, Sacramento Northern.

Among those who participated in the discussion were W. H. Renaud, Jr., New Orleans Public Service, Inc.; J. H. Dennis, Seattle Municipal Railway; L. H. Butterworth, Boston Elevated Railway; Ray Taylor, Municipal Railway of San Francisco; Earl E. Grover, Columbus Railway, Power & Light Company; Paul W. Klabunde, Milwaukee Electric Railway & Light Company, and S. A. Bishop, Pacific Electric Railway.

Temple Square, Salt Lake City



Mormon Temple and Tabernacle where delegates on Red Special Train listened to daily organ recital

Digitized by Google

Brady Awards

Won by

Duluth, Colorado Springs, and Lethbridge Railways

Contest based on accident statistics for 1929 submitted on the association's standard report form. Records of more than 200 companies considered

ANNOUNCEMENT of the winners of the 1929 Anthony N. Brady Awards and the presentation of medals and certificates were made at the convention of the American Electric Railway Association held in San Francisco, June 23-26, 1930. The Class A prize was won by the Duluth Street Railway, Duluth, Minn., with honorable mention going to the Ottawa Electric Railway, Ottawa, Canada. In this class, 54 companies operating 5,000,000 or more car and bus-miles annually, submitted their accident statistic reports, which were analyzed for this contest. In Class B, including companies operating from 1,000,000 to 5,000,000 car and bus-miles annually, the first prize was awarded to the Colorado Springs & Interurban Railway, Colorado Springs, Col., with honorable mention to the Calgary Municipal Railway, Calgary, Alta., Canada. Seventy-nine companies competed for this prize. In Class C, including companies operating less than 1,000,000 car and bus-miles annually, the Lethbridge Municipal Street Railway, Lethbridge, Canada, and the Montana Power Company, Missoula, Mont., won the first award and honorable mention respectively. Sixty-eight companies were represented in this class.

Members of the American Museum of Safety and the American Electric Railway Association formed a joint committee to select the winners of these awards. They were Lewis Gawtry, president of the Bank for Savings, chairman; Colonel A. B. Barber, manager of transportation and communication department, U. S. Chamber of Commerce; James H. McGraw, chairman of the board, McGraw-Hill Publishing Company, Inc., and Charles Gordon, managing director, American Electric Railway Association. The awards are a memorial to the late Anthony N. Brady, and are presented each year for the best records of safety made by electric railways in the United States or Canada.

Contest winners this year were determined on a different basis than those of previous years. Heretofore, the actual accident record of the contestant was considered as only 50 per cent of the total scoring. Other factors making up the remaining 50 per cent included: success in gaining good will through efforts or improved safety conditions; open-mindedness in applying original ideas and new developments, originating with others, as to safer operating methods and equipment; reduced maintenance or greater reliability of service resulting from improvements in safety practice; co-operation between management and employees in safety promotion; outstanding accomplishments in measures to promote sanitation and health. Briefs setting forth these factors of accomplishments and the methods by which they were obtained were required from the contestants.

In order to have more companies represented in the contest, the committee decided to change the basis on which the awards would be made. This year the companies submitting their accident statistics were rated according to the number of injuries and number of fatalities reported for the year 1929, the relative rating being 2 to 1—that is, each fatality counted twice as heavily against the company as an injury. The reports used for the committee's analysis were those submitted by the railways on the forms of the American Electric Railway Association. Companies were also invited to submit briefs during the year's contest, so that in case of a tie the briefs might be referred to for further data.

Analysis of the 200 accident statistics reports, which represent a large portion of the electric railway industry, impressed the committee with the degree to which the practice of safety has been developed by the electric railways of the country. How many lives have been saved by this intensive safety work it is impossible to estimate, but undoubtedly the number is very large.

Some idea of it may be gained from the fact that while the volume of traffic handled by street railway companies was about the same in 1929 as in 1920, the number of electric railway fatalities has been reduced from 2,124 to 1,600. This is the more striking in view of the 187 per cent increase in motor vehicle registrations during that period, with its consequent increase in street and highway congestion and an increase in all

Digitized by Google

street and highway fatalities from 17,055 in 1920 to 33,060 in 1929. The electric railway record is one of the few bright spots in the discouraging story of constantly increasing traffic accidents.

The electric railway figures quoted above cover all electric railway fatalities including pedestrians, occupants of automobiles, employees, passengers and others. When the figures on passenger fatalities are examined—fatalities to the people who trust their safety to the street railways—the record is remarkable. The statistics show that only one passenger out of each 300,000,000 carried is killed. That means that the equivalent of more than two and one-half times the population of the United States is regularly transported on the street cars of the country with the loss of only one life.

For the Class A award, the Duluth Street Railway and the Ottawa Electric Railway ran a very close race. Their properties are similar in that each operates both city and interurban service. The Duluth company operates 111 cars and eleven buses, a total of 122 vehicles, while the Ottawa company operates 115 cars and ten buses, a total of 125 vehicles. In Duluth a total of 5,461,671 miles were operated, of which 4,716,050 were car-miles and 745,621 were bus-miles. As compared to this, Ottawa Electric Railway operated 5,149,246 miles, of which 4,716,490 were car-miles and 432,756 were bus-miles.

The accident record submitted by these two companies and the scoring of points against each, as explained above, is as follows:

	Duluth St. Ry. Duluth, Minn.	Ottawa Electric Ry. Ottawa, Canada
Number of fatalities, 1929		
Railway	2	3
Bus	0	0
Total	2	3
Number of injuries, 1929		
Railway	124	100
Bus	12	13
Total	136	113
Number of fatalities per 1,000,000 miles		
Railway	0.42	0.64
Bus	0.00	0.00
Total	0.37	0.59
Number of injuries per 100,000 miles		
Railway	2.63	2.12
Bus	1.61	3.00
Total	2.49	2.19
Score for fatalities		
Railway	6.72	10.24
Bus	0.00	0.00
Total	5.80	9.38
Score of injuries		
Railway	21.04	16.96
Bus	12.88	24.00
Total	19.93	17.55
Total score	25.73	26.93

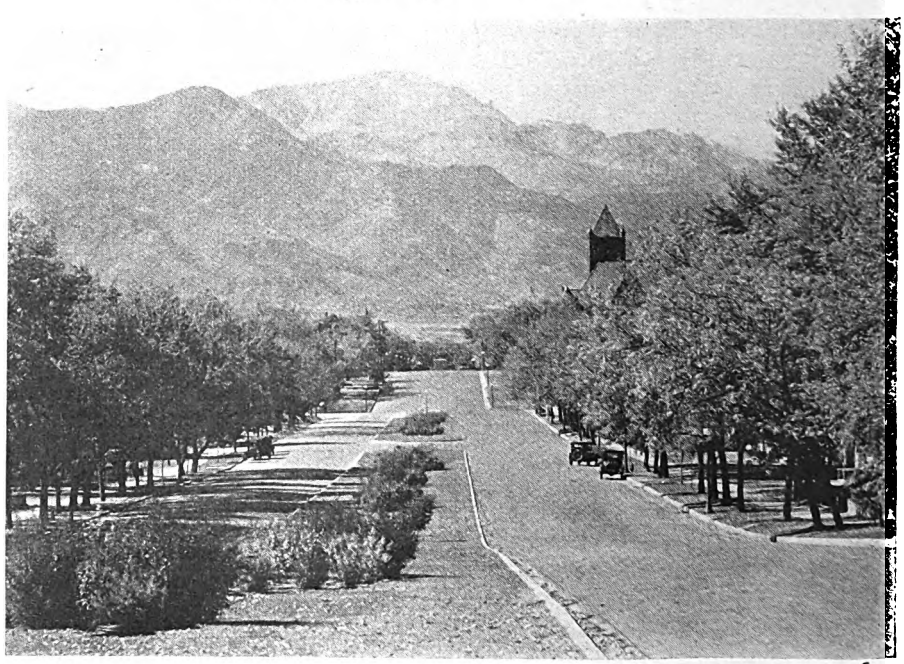
	Colorado Springs & Interurban Ry. Co. Colorado Springs, Col.	Calgary Municipal Ry. Calgary Alta., Canada
Number of fatalities		
Railway	0	0
Bus	0	0
Total	0	0
Number of injuries, 1929		
Railway	4	16
Bus	0	..
Total	4	16
Number of fatalities per 1,000,000 miles		
Railway	0	0
Bus	0	..
Total	0	0
Number of injuries per 100,000 miles		
Railway	0.30	0.52
Bus	0	..
Total	0.27	0.52
Score for fatalities		
Railway	0	0
Bus	0	..
Total	0	0
Score for injuries		
Railway	2.40	4.16
Bus	0	..
Total	2.16	4.16
Total score	2.16	4.16

Class B contestants, those operating from 1,000,000 to 5,000,000 car and bus-miles annually, were led by the Colorado Springs & Interurban Railway, a company operating city and interurban service, while the Calgary Municipal Railway received honorable mention. The Calgary company operates only city service. A comparison of equipment and miles operated between these two companies is as follows: Colorado Springs company operates twenty cars and three buses, while the Calgary company operates 81 cars and no buses. In Colorado Springs, a total of 1,493,024 vehicle-miles were operated during 1929, of which 1,341,137 were car-miles and 151,887 were bus-miles. The Calgary Municipal Railway oprated 3,070,251 car-miles. The accident records with respect to injuries and fatalities together with the corresponding score for place, are as set forth in detail in the table at the left.

In the third group, or Class C, the Lethbridge Municipal Street Railway operates city service only, while the Montana Power Company operates city and interurban service. In Lethbridge five cars operated 253,064 miles during 1929 while the Montana Power Company operated nine cars over 440,663 miles. Their statistics and ratings are shown in the following table:

	Lethbridge Municipal St. Ry., Lethbridge, Canada	Montana Power Co., Missoula, Mont.
Number of fatalities, 1929	0	0
Number of injuries, 1929	0	1
Number of fatalities per 1,000,000 miles	0	0
Number of injuries per 100,000 miles	0	0.23
Score for fatalities	0	0
Score for injuries	0	1.84
Total score	0	1.84

Colorado Springs and Pike's Peak



The delegates on the Red Special had an opportunity to see the Peak and inspect the property of the Colorado Springs & Interurban Railway

Digitized by Google

T. & T. Studies

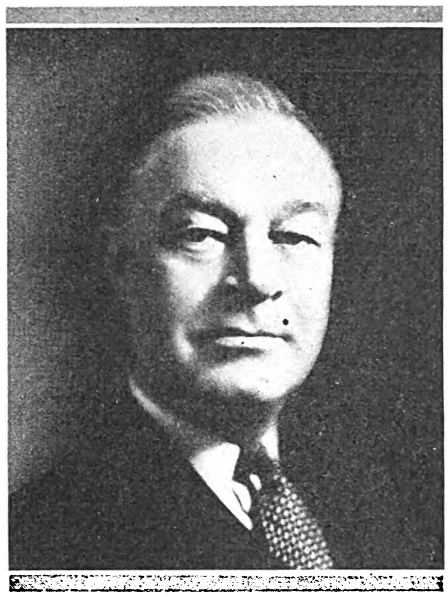
Industry's Fundamental Problems

THREE interesting meetings were held by the American Electric Railway Transportation and Traffic Association at the San Francisco convention. They were attended by a large group which participated actively in the program with discussions, both prepared and extemporaneous. Consideration was given to five committee reports—the transportation employee, movement of the vehicle, operating economics, the passenger and equipment. The sixth report, on small city operation, was read at a luncheon conference.

In the absence of Samuel Riddle of the Louisville Railway, president of the association, Paul E. Wilson of the Cleveland Railway, first vice-president of the association, took charge of the meetings.

The presidential address of Mr. Riddle was presented at the opening of the first meeting by George B. Anderson of the Los Angeles Railway. Mr. Riddle referred to the interesting early history of the T. & T. Association and pointed to the progressive steps it has taken leading up to the present.

"The Transportation and Traffic Association," Mr. Riddle stated, "while the youngest of the affiliated bodies of the A.E.R.A., has made valuable contributions to the industry through the study, research and deliberations of its many committees. The industry's very life depends on the major problem that confronts us today, the diminishing number of riders. We are scarcely maintaining the number of passengers heretofore carried economically and are not receiving the benefits that might be expected to accrue from constantly increasing population. Our plants generally have been estimated to keep pace with the improvements in the arts and sciences, but we do not find a proportionately augmented demand for the service we are capable of rendering. We are challenged today by more private automobiles than ever before. The result of their existence not only is a decrease in the use of mass transportation and an ever-increasing traffic congestion, but our service also is made less attractive to our patrons because we are unable to attain the highest rates of speed possible through the use of modern equipment."



Samuel Riddle
President

Mr. Riddle commented on the subjects selected for committee study during the past year and praised the work of the selected groups.

The report of the transportation employee committee, of which Clinton D. Smith, Cleveland Railway, was chairman, was presented by Jeff L. Alexander, Houston Electric Company. Special attention was given to an analysis of the transportation job with the correlated subsequent supervisory and employee training and a study of proneness to accidents. Each of these subjects was broken down in the report and the individual parts thoroughly analyzed.

Comments upon the report submitted by Prof. Henry H. Norris of the Boston Elevated Railway were read by the chairman. Professor Norris listed six fundamental considerations with respect to the employee. Intrusting the selection to the highest possible type of men, stressing the quality of the contact man, instilling the sales instinct in the men and discouraging snap judgment, analyzing the mental and personal qualifications, and applying psychology. He commented on the advantages in psychological study for the reduction of accidents and indorsed the usefulness of the supervisory conference plan for supplemental training. He also referred to the early work of the association in solving this problem, and pointed out that increasing benefits are accruing from continued research.

A. T. Mercier, Pacific Electric Railway, pointed out that although the present policy of studying past records of employees and then improving them is necessary, more attention should be paid to the proper selection of candidates for positions. He recommended the use of efficiency tests for the classification of employees into groups according to their weaknesses and paying especial attention to each class. "Leadership, discipline, rewards, and remedies," stated Mr. Mercier, "are necessary for developing the most efficient type of personnel."

In support of Mr. Mercier's comments, R. B. Hill, Los Angeles Railway, further emphasized the need for finding competent men. He urged that more money be spent to select men and that the electric railways make their working conditions attractive to the proper type of men. He also pointed out that care should be taken in selecting and training men for departments other than the transportation department. In concluding, he advised that department heads gain the confidence and support of their men through frequent, personal contacting.

An interesting comparison was made by Leslie Vickers, economist of the association, of the sales possibilities for the electric railways and the other public utilities. He pointed out that in the case of the telephone, electric lights and gas, a favorable impression is made upon the public through physical equipment. In contrast to this, he said, the product of the electric railway is dispensed solely by the men on the vehicles. Therefore, their contacts vitally influence the impression of the public. "The transportation employee," Mr. Vickers

Digitized by Google

stated, "needs to know, first, his job; second, the product that he is selling; and third, the people to whom this ride is sold." In analyzing this third point he suggested that employees make a study of patrons, since it is to human beings that the service is being sold.

The second report of the day, movement of the vehicle, of which C. W. Wilson, Pittsburgh Railways, was chairman, was presented by E. J. McIlraith, Chicago Surface Lines. Mr. McIlraith analyzed all of the important sections of the report and commented extensively on those phases which he considered were of greatest interest to the association. Four subjects were covered in the report: the private automobile, the parking problem, signals and traffic control, and equipment.

Mr. McIlraith, in reviewing the parking problem section, restated the general principles that first, parking is a privilege and not a right; second, parking may be tolerated and should be permitted where it does not interfere with the right of the general public to use public ways for travel purposes; third, where parking is permitted it should be regulated in such a manner as to promote safety, a minimum of interference with travel uses, and an equitable distribution of curb space available among operators of vehicles who desire to park; and fourth, where parking interferes with essential travel uses the privilege should be modified, or if necessary, withdrawn.

Some valuable points on making traffic studies were added by Mr. McIlraith in discussing the subject of traffic signals and control. He urged the proper application of signals, following detailed analysis of the requirements, and differentiated between speed and recklessness, in connection with the accident hazard. On the subject of equipment, he read the principal features of existing equipment which are most readily susceptible of improvement, and pointed out that with good equipment the most in the way of speed can be obtained through proper schedules.

A. J. Lundberg, Key System Transit Company, suggested the solving of the traffic problem on the basis of facts. He differed with an opinion in the report that "it is too early in the development of the automobile and facts are too inadequate to draw definite conclusions with respect to the ultimate competitive effects of the private automobile on collective transportation," stating that sufficient knowledge of the automobile's effects in cities of all population classes is available to make analyses of the problem and remedies. He urged that the railways take every possible step to meet the competition of the private vehicle and to rid themselves of a "bankruptcy complex" by keeping the physical plant in the neatest, brightest appearing condition. In concluding, Mr. Lundberg commented on the number of vehicles passing through a given intersection necessary to justify the installation of a traffic signal.

Following the president's address at the opening of the session, the reports of the executive committee and the secretary-treasurer were accepted. In the last report the procedure of the small city committee through the past year was outlined.

Officers for the ensuing term, as selected by the nominating committee, were approved by the association. They are:

President—Paul E. Wilson, vice-president and secretary Cleveland Railway.

First Vice-President—George B. Anderson, director of personnel Los Angeles Railway.

Second Vice-President—R. N. Graham, manager of railways Pennsylvania-Ohio Public Service Corporation.

Third Vice-President—F. L. Butler, vice-president, Georgia Power Company.

Secretary-Treasurer—Guy C. Hecker, general secretary American Electric Railway Association, New York.

Executive Committee—The officers and Adrian Hughes, Jr., superintendent of bus transportation United Railways & Electric Company of Baltimore; D. L. Fennell, general superintendent of transportation Kansas City Public Service Company; C. H. Evenson, superintendent of transportation Chicago Surface Lines; and William W. Holden, manager traction department San Antonio Public Service Company.

Wednesday Session

THE report of the committee on operating economics occupied the entire second session, held on Wednesday. The report, prepared under the chairmanship of Joe R. Ong, Cincinnati Street Railway, was presented by J. B. Stewart, Jr., of the same company. Mr. Stewart selected a number of the most interesting parts and concentrated on these. Five subjects were covered by the committee during the year, those operating practices which have resulted in an increase in gross revenue and those decreasing the cost for operation and maintenance, one-man cars, bus substitution, business-getting and fares. Under the first subdivision a number of practices beneficial to the railway were described.

Comments of the chairman, Joe R. Ong, were submitted by letter and read by Frederick C. J. Dell of the association. Mr. Ong confined his comments to appendices A and B, dealing with proposed methods of cost distribution to routes and classes of bus and electric railway service. He made a number of suggestions for the use of proper units in these proposed methods for the distribution of costs.

Stress was laid by C. L. Van Auken, Electric Traction, on the need of proceeding in this work on an analytical basis. He pointed out that added economies could be secured from further study and that increased revenue could be obtained with intensive research. He also spoke of the need for a scientific fare structure.

At this point, Carl W. Stocks, editor of *Bus Transportation*, was called upon to give observations of his trip by bus from New York to San Francisco. He gave some very interesting details of the 3,400-mile trip and outlined practices with regard to schedules, maintenance and terminal facilities of the long distance bus companies. He spoke favorably of the systematic maintenance and care of these vehicles, reflected by the fact that no serious trouble developed at any time.

"Co-operate with the accounting department in making a cost analysis," was the plea of H. E. Jordan, Los Angeles Railway. He stated that electric railways are handicapped greatly by the lack of satisfactory cost accounting systems and compared the railways as manufacturers of rides, to other large successful manufacturers having comprehensive accounting systems. He further pointed out the possibilities of improving the service and estimating the life of equipment through the securing of accurate and complete data and analyzing these intelligently.

Lester J. Turley, Los Angeles Railway, commended the report on operating economics, particularly the new ideas advanced in it. He told of the use of a manual of operating methods by his railway and told of the results obtained. He also spoke of making a passenger origin survey in Los Angeles and the employees' welfare work of his company.

Comments of A. T. Mercier, Pa-

Digitized by Google

cific Electric Railway, were read by F. E. Geibel of the same company. He stressed the need for comprehensive analyses of practices and costs and stated that the possibilities with existing equipment should be studied first. Concluding, he suggested use of talking movies for advertising.

In answer to inquiries of how the Cleveland Railway adjusted its operating expenses following changes in the fares set-up, Paul E. Wilson explained the type of franchise under which the Cleveland Railway is operating and told of how the accounts are handled. He pointed out that in Cleveland the expenses force the adjustment of fares.

L. R. Nash, Stone & Webster Service Corporation, speaking on the subject of cost analyses, showed the need for a real study of costs so that new classes of business can be developed.

An interesting reflection on the public's reaction to the proposed substitution of trolley buses for gasoline buses was given by E. F. Thayer, St. Louis Public Service Company. He stated that much opposition was voiced to the change in St. Louis and concluded that, from the public's standpoint, the trolley bus occupied a midway position between the street car and gasoline bus.

Thursday Session

At the final meeting of the T. & T. Association, two committee reports were presented, those on the passenger and on equipment. The first was given by William W. Holden, San Antonio Public Service Company. Mr. Holden spoke of the high points of the report, explained the purposes of entering a new phase of study and outlined the procedure to be followed in making market analyses of certain properties. Briefly, the plan is to have Dr. W. J. Reilly, selected for this work, visit the properties for a short period and instruct the personnel in methods of making and analyzing a market survey. Certain parts of this work have been completed, but the plan has not advanced to a point where definite conclusions could be included. The purpose, as explained by Mr. Holden, is to obtain a real knowledge of the desires of the people as a whole for public transportation.

W. H. Lines, Pacific Northwest Public Service Company, spoke of the good results bound to result from market analyses and pointed out the many possibilities of such a survey in learning the attitude of the public, stimulating business and effecting service improvements. He compared the plan to similar efforts of successful manufacturers who produce a good product, develop suitable markets and then inaugurate intensive sales campaigns. Mr. Lines also touched on the franchise situation in Portland and the outlook of transportation in that city.

"Uniform market analyses," stated J. P. Potter, Key System Transit Company, "would be of real benefit to all carriers in the industry." He pointed out that surveys of this kind would show the managements what is lacking in equipment and service and would enable them to get the public and civic authorities interested in transportation. He also told of a house-to-house canvass, made by his company in Alameda, to determine what the people thought of the company and its service.

"Merchandising," stated O. A. Smith, Pacific Electric Railway, "is the basic principle of any business. The railways must recognize this if they are to increase their revenue." Determine what the public wants and then satisfy these desires, was the advice of Mr. Smith. He spoke at some length on the results of fare changes in Glendale and Pasadena, and indicated that by making surveys the results of these and other changes could be forecast.

Some interesting facts which were developed by the market survey made in Roanoke, Va., were related by Walter Jackson, consultant of Mount Vernon, N. Y. He analyzed the relative uses of the pass in the different hours of the day in two districts, one of these being a higher class district. He also spoke of the effect of the telephone and radio, as well as other factors which had an effect on the riding statistics secured in the survey.

The report of the committee on equipment, of which L. C. Datz of the St. Louis Public Service Company was chairman, was presented by F. L. Butler, Georgia Power Company.

In commenting on the report, C. E. Morgan, Cincinnati Car Corporation, stated that along with placing new equipment in service the railways must determine their markets and the needs of the people. He cited the experiences in Brooklyn of interviewing riders relative to new cars and how vital information which influenced future car design was obtained.

F. E. Geibel, Pacific Electric Railway, told of making several changes in car design and the results of these on the riding public. "All elements of car design," he said, "must be considered from the standpoint of rider appeal." He also spoke of the effect of new equipment in developing the interest of employees.

At the official closing of the convention, C. E. Morgan praised the work of President Samuel Riddle throughout the previous year and welcomed the new president, Paul E. Wilson, in behalf of the association.

Transportation Problem Outlined to Electrical Men

SPEAKING at a luncheon meeting of the San Francisco Electrical Development League at the Palace Hotel on Monday, Charles Gordon, managing director A.E.R.A., presented an outline of the local transportation problem and its relationship to general business. He pointed out that it would be physically impossible to provide individual transportation in congested districts for everyone who wishes to ride. In fact, it was the congestion caused by the use of individual vehicles more than 200 years ago in the streets of London that resulted in the inauguration of the first public transportation service. Today a tendency exists to think of the transportation problem in terms of vehicles rather than people. Such an approach to the problem is wrong, he said, as it is people, not vehicles, who do business. He pointed out that one four-track rapid transit line will carry more people than 25 express boulevards, and one double-track street railway line will carry more people than four express boulevards. It is essential that the relative carrying capacities of these different facilities be correctly appraised by the public if an effective solution is to be found for the local transportation problem.

Digitized by Google

Economics, Methods and New Designs

Studied by Engineers

APPLICATION of engineering practices to all phases of railway activity, with the aim of increasing the number of riders and catering to their comfort and convenience, was the principal subject of papers and discussions at the three general meetings of the Engineering Association in San Francisco. Contrary to the practice which has been adopted at the past several conventions, separate sessions were not held by the divisions of this association. Reports of the various committees were presented at the second meeting. At the third session, held on Thursday morning, the following officers were elected for the coming year:

President—L. D. Bale, superintendent of power Cleveland Railway.

First Vice-President—Charles H. Jones, general manager Chicago, South Shore & South Bend Railroad, Michigan City, Ind.

Second Vice-President—P. V. C. See, superintendent of equipment, department of railways, Northern Ohio Power & Light Company, Akron, Ohio.

Third Vice-President—E. M. T. Ryder, way engineer Third Avenue Railway System, New York.

Secretary-Treasurer—Guy C. Hecker, general secretary American Electric Railway Association, New York.

Executive Committee—The officers and W. W. Wysor, junior past-president, chief engineer United Railways & Electric Company, Baltimore, Md.; Howard H. George, superintendent of way Cleveland Railway; A. T. Clark, superintendent of rolling stock and shops United Railways & Electric Company, Baltimore, Md.; W. E. Bryan, superintendent of power St. Louis Public Service Company; and J. Fleming, purchasing agent Capital Traction Company, Washington, D. C.

President W. W. Wysor, of the Engineering Association, in his address urged the engineers to realize the responsibility which rested on them in all departments of the railway. He said in part: "We were faced during the war with a crisis no other major industry was called upon to bear—100 per cent increased operating expenses with little or no increase in fare. The engineers' answer was greater efficiency accomplished through numerous economies and the use of labor-saving machinery, as well as building better and more lasting structures. Machinery which was not used when labor was cheap was pressed into service with increased efficiency and better work.

W. W. Wysor
President

"With the economic limit of rate of fare already reached in many cases the question arises as to how we are to meet a keenly competitive situation which has now arisen and still keep our properties solvent. We must seek still further economies, more efficient methods and ways and means of increasing the number of riders. We must cater to that class of people to whom the difference between 10 cents and $1 means much; to the man who is becoming tired of the eternal pursuit of a parking space; to the mid-day shopper; to the person who is seeking just a little more in the way of speed, comfort and convenience. We must seek further relief from the burdens of taxation, which are unreasonable and unjust. We must seek for reduction in street congestion, especially unreasonable parking of private automobiles. In the hands of the engineer rests the secret of the solution of many of these problems."

Following the president's address a paper on "Electric Railway Special Trackwork" was presented by B. P. Legaré, engineer of maintenance-of-way and construction Market Street Railway, San Francisco. He reviewed the development of special track construction during the past 25 years and discussed in detail the modern construction of special work employing manganese and chrome nickel. "The problem of crossing design," said the speaker, "should be approached both from the engineering and foundry viewpoint, making full-size samples of numerous designs of crossing intersections and then subjecting them to destruction tests. The engineer must determine the direction of the forces acting upon the structure and then design a theoretical structure capable of withstanding those forces. The foundryman must examine the engineer's design and determine whether the theoretically designed sections can be made solid and without defects of other natures, for unless the metal sections are sound they cannot possess the properties ascribed to them by the engineer."

Regarding the question of what type of special work should be used by a company, Mr. Legaré said that there is no hard and fast rule. All kinds of conditions enter into the subject; the main ones being the amount of traffic, the cost, and in some locations pavement alone decides the type." Following the paper a discussion by members of the association brought out a comparison of the various advantages and disadvantages of manganese and chrome nickel steel structures.

Frank M. Harris, chief of the bureau of specifications and estimates, department of engineering, Pacific Gas & Electric Company, San Francisco, presented an interesting study on "The Relationship of Purchasing and Engineering."

"The Engineer and His Valued Influence in Western Development," was the subject of an address by A. T. DeForest, vice-president United States Steel Products Company, San Francisco. The speaker paid tribute to the engineers of the electric railway industry, as well as to other engineers and their work in developing the resources, transportation and general progress of the West.

A paper on the "London Omnibus and Other Forms of Passenger

Digitized by Google

B. P. Legaré

Transportation" was presented by George J. Shave, operating manager and chief engineer London General Omnibus Company, Ltd., London, England.

Mr. Shave made no attempt to compare conditions in London to those in our American cities when he advocated the general use of the bus rather than the street car. He pointed out how narrow streets, traffic congestion and short turns would be a handicap to successful electric railway operations in London. He stated that the 50-passenger double-deck, four-wheel bus seemed to be the solution of the transportation problem in that city. Mr. Shave told about the research work his company is carrying on with the heavy oil compression ignition type of engine. He stated that he believed an engine of this type will come into general use in the very near future. At present the London General Omnibus Company is operating about 100 buses in which Diesel engines have been installed.

The final paper of the first session, on the subject of "Economies of High-Speed Street Car Motor and Drive," was presented by C. Bethel, manager railway motor engineering department, Westinghouse Electric & Manufacturing Company. This paper was received with a great amount of interest by the delegates and brought forth some interesting discussions and questions. During the discussion, H. H. Adams, superintendent of shops and equipment Chicago Surface Lines, gave a valuable supplement to this paper by informing the meeting of the results so far obtained on his property with high-speed motors and drives. He confirmed Mr. Bethel's contention that the high-speed motor was here to stay and that its further development would be of great value to the industry.

Committe Work Reviewed in Two Sessions

Reports of the various committees of the Engineering Association occupied the greater part of the second and third sessions held on Wednesday afternoon and Thursday morning. For the most part, abstracts of the different reports were read before the sessions and, in a number of cases, were followed by active discussions. Particularly interesting discussions were held on several of the power committee reports and on the report which dealt with rail corrugation. On the latter subject a number of delegates told of their experiences with corrugation under various conditions and of the practice, which is becoming quite general, of grinding new rail immediately after it is laid.

The only paper to be presented at the second session was given by Lester S. Ready, consulting engineer of San Francisco. The subject of his paper was "Engineering Challenges of the West." Mr. Ready did not deal with engineering problems of the street railway, but very completely and interestingly gave the delegates a picture of California and the West in general from an engineering standpoint. He described the number of engineering problems which had been met during the development of California and also of projects which are planned for the near future. He dealt specifically with distribution of water, power transmission, and highway construction.

L. S. Ready

During the third and final session, a paper on the elimination of waste, prepared by A. S. Duncan, assistant director of finished stocks, Westinghouse Electric & Manufacturing Company, was read to the association. An abstract of this paper is published elsewhere in this issue. A second paper presented at this session, "Modern Vehicles and Equipment for Urban Transportation," was prepared by C. A. Burleson, transportation engineering department, General Electric Company, and read by L. Larson, San Francisco representative for the General Electric Company.

The closing acts of this association were to elect the officers for the coming year and to induct them into office.

Engineering Influence in Western Developments

Speaking before the Engineering Association, the author credited the engineer and the electric railways with the foresight that broadened areas of agriculture and industrial operations

By A. T. De FOREST
Vice-President United States Steel Products Company
San Francisco, Cal.

SINCE the days of '49 and the several succeeding years, during which immense wealth was taken from the mines and streams of California, rapid strides have been made in the direction of improved means of transportation and communication, also in the development of agriculture, industries, and transportation by both railroads and

Digitized by Google

steamships. Railroads have been constructed and extended, and extensive highways provided for vehicular traffic to reach what were far distant and inaccessible sections, and there is more to follow. Along these developed lines of transportation, local improvements, communities and new industries have arisen.

In the development of manufacturing industries, the question of power was the important one. No coal of high quality was to be found, and the discovery of oil was yet to come. Therefore, the power in our mountain streams furnished a subject of study. With the long distance existing between the points of possible production of hydro-electric power, and the desired points of utilization of the same, it required able engineers to conceive, and bold promoters to finance, the projects to meet these conditions in the West. The first long-distance high-voltage transmission line in the world was constructed in 1891 in southern California by Prof. C. G. Baldwin. This engineering, constructing and financial genius laid the foundation for our great electric public utilities.

A. T. DeForest

The increase of population brought an urban and interurban transportation requirement, and the growth and breadth in agricultural development produced a like requirement. These needs came to be provided for, in a large measure, by electric railways, made possible by the abundance or cheap electric power. These electric railways have tended to further broaden the areas of agriculture and industrial operations, and build up many communities distant from our metropolitan centers. They brought comforts to the people, and, naturally, increased realty values. Many of them replaced unremunerative service of steam railroads so that they were welcome even to their competitors.

Relations of Purchasing and Engineering

The speaker, before the Engineering Association, pointed out the necessity for engineering advice and responsibility in present-day purchasing

By FRANK M. HARRIS

Chief of Bureau of Specifications and Estimates
Department of Engineering, Pacific Gas & Electric Company
San Francisco, Cal.

BOTH purchasing and engineering have been evolving rapidly during the past two generations. Forty years ago purchasing embraced a knowledge of prices and their seasonal and cyclical trends, where and when to buy, and in what quantities, for maximum economy. During the past twenty years, however, the purchasing agent has been confronted with new factors involving the economies of production and distribution in his markets, coupled with fundamental advances in scientific research and in technical engineering.

The old time purchasing agent with his sound business ability and his trading sense came to talk a new language in which chemistry, mechanical reliability, economies of performance, and technical suitability for a given use are discussed. Steel was no longer just steel; it must satisfy one of the many standards of the national technical societies, in which carbon, phosphorus, and sulphur are specified to one-hundredths of one per cent. Paint was no longer just paint; it must contain certain vehicles and certain proportions of pigments of certain specified ingredients and must pass certain specified tests before and after application. The purchase of all of the common materials of industry was thus complicated by fine technical requirements and standardized specifications, which seriously handicapped the old time purchasing agent buying on price alone.

In parallel with the growth in the complexity of purchasing, an equally distinct transition was apparent in the engineering profession. The engineer of 40 years ago was a specialist in name only. He designed, bought materials, contracted labor and supervised construction, supposedly with equal skill, even when he was not called upon to lend a hand with the financing of the project upon which he was retained. With the entry of specialization into his profession, the engineer was confronted with the necessity for skilled assistance in purchasing, in the person of a specialist who knew markets, materials and vendors, and who could buy wisely.

Frank M. Harris

No feature of purchasing is more important than that of the inspection and testing of materials and equipment. Shall the purchasing agent or the engineer be charged with that? Who shall control the research and development work in the industry concerned? Who shall have the approval of performance bonds, payments on contracts and guarantees? Who shall accept completed work?

Where these technical decisions are being made by engineers attached to the staff of the purchasing agent, the purchasing department is to that extent becoming an engineering department and to precisely that extent is weakening the authority of the engineer, without relieving him, in the slightest degree, of his responsibility.

If this authority - responsibility measuring stick be applied, fairly and fearlessly to co-ordination problems, the division of duties will be such that none can complain and the millennium will have come.

Digitized by Google

Economies of

High-Speed Motor and Drive

In this address before the Engineering Association, Mr. Bethel shows how high speed affects operation and design

By C. BETHEL

Manager Railway Motor Engineering Department
Westinghouse Electric & Manufacturing Company

ECONOMIES and advantages of high-speed electrical apparatus design are now well established. The operating speeds of turbines, generators, rotaries and heavy traction motors have all been increased in order to obtain reduced weight for the same rating. Why not take advantage of speed in street railway motor design? In the past this could not be done, except to a limited extent, because of the limitations of single reduction gearing. These limitations have been removed. Inherent economies in power, schedule speeds and maintenance have been shown.

Operation over a period has given a clearer picture of the problem of correlating the motor, drive and truck design, and has brought out the necessity of doing so to get the greatest benefit from the new design.

A more consistent and determined effort on the part of both designers and operators has probably been directed toward the reduction of weight than toward any other one feature of the street car. The original single reduction motor, which was rated at 30 hp., weighed, complete with gears and gearcase, 2,750 lb. The latest axle hung motor rates 35 hp. and weighs 1,475 lb. complete with gears and gearcase. This reduction in the motor weight was brought about by developments in both the motor and in high-speed gearing. The high-speed motors now in common use have a rated speed of about 2,000 r.p.m., in the 35 hp. size, and weigh about 560 lb. or 1,060 lb. complete with gears. These weights in the 50 hp. size are 830 and 1,325 lb.

The high-speed motor need not differ fundamentally from the conventional type. It can be built for 600-volt operation along the lines of its very much larger predecessor. However, it is so small that better

C. Bethel

performance will be obtained if a 300-volt design is used. The reason for this is that, with the small commutator, the distance between brushholders becomes so short that the motor is too sensitive to flashing when it operates on 600 volts. With 300 volts on the commutator, however, the volts per inch of periphery are cut in half and the motor becomes much more stable. The voltage to be commutated is also less in the case of the 300-volt motor. There is a further practical gain in the stability of this motor due to its spring suspension, which results in the brushes riding the commutator better. The 300-volt motor is, of course, insulated for 600 volts.

In bringing out the 300-volt motor, the only possible exception to the superiority of 300 volts over 600 volts was the question of the effect on wheel slippage. However, after a service of over one and a half million car-miles with 300-volt motors under all operating conditions of snow, ice, leaves and slippery rails, not one case of wheel slippage due to the use of this voltage has been reported. In other words, the use of 300 volts has been a prominent factor in the development of the high-speed motor.

In order to use this high-speed motor, some form of high-speed gearing with a high gear ratio had to be provided. The problem is to secure a gear ratio up to about 10:1, to eliminate gear noise, to obtain a long gear life, and to obtain a good overall truck design. The worm gear meets the first two requirements of the problem entirely. Ratios even greater than 10:1 may be built quite successfully. The worm gear is inherently the quietest form of gearing, and it never becomes noisy. There is a further advantage inherent in the worm gear in that, with it, it is possible to obtain a large ratio with a minimum of parts.

The principal disadvantage of the worm gear is that it is less efficient than the other types of gears and requires that the motor be placed in the truck with its axis perpendicular to the axle.

The simplest form of gearing is the spur type. While the conventional type of spur gears is somewhat noisy the development of the self-contained gear unit of the double reduction type has virtually eliminated all gear noise. The primary reasons for this are: Bearings on each side of the gears and pinions prevent shaft deflections and assure correct alignment of the gear teeth; roller bearings assure permanently correct gear centers; bearings of large thrust capacity permit the use of gears of large helix angles; running the gears in a bath of clean oil maintains the gears in their original condition for a long period.

With these two tools—the high-speed motor and the gear reduction unit—we have the basis of practically all of the new street car drives. Two fundamental types of drives have been developed so far in this country—parallel and right-angle.

The forerunner of the present type of parallel drive was placed in service in Wheeling, W. Va., in 1925. This was a modification of a standard 35-hp. motor driving a single reduction gear unit through one coupling. At the end of the test, after 80,000 miles of operation, these conclusions were reached: (1) The feasibility of connecting the gear unit and motor through one coupling was established; (2) to take full advantage of the benefits that were established by this drive requires a lightweight high-speed motor. These features were incorporated in 1927 in the high-speed 300-volt motor and WN drive.

Digitized by Google

The first application of the right-angle drive was made in Springfield, Mass., in 1927. This drive incorporated a number of features then untried in street railway service. The more important of these are: worm drive; differential; provisions for transmitting traction to the axle through semi-elliptic springs; high-speed 300-volt motor.

A number of developments have followed these, but the differences have been in detail and in arrangement. The principal features now being incorporated in the various drives are: (1) the high speed motor; (2) both parallel and right-angle types of drives; (3) trucks with inside and outside journals, with the semi-elliptic spring type of side frame and with the rigid type side frame. Except in fairly minor variations in detail, all of the new type high-speed motor drive designs embody some combination of these features.

One of the chief virtues of the high-speed motor is that its size is such that a material reduction in wheel size and floor height can be made. The WN drive is designed to operate on 22-in. wheels, with 1 in. greater clearance than is obtained with standard motors on 26-in. wheels. It was thought at one time that there might be a slight increase in the wheel and track maintenance due to the use of 22-in. wheels, but experience indicates a decrease.

Modern Vehicles and Equipment for Urban Transportation

Features of modern street cars, trolley buses and gas buses were described by Mr. Burleson before the Engineering Association

By C. A. BURLESON
Transportation Engineering Department
General Electric Company

TRANSPORTATION companies nowadays have so many types of vehicles and varieties of equipment to choose from that it is difficult to know which type of vehicle to select and what equipment to use. Many things besides the economics of the question affect the operator's decision.

In Chicago we find 99 heavy duty, 60-passenger, two-man single-end cars weighing 44,000 lb. and equipped with four 50-hp. motors, PCM-18 point control and straight air brakes with quick application and release valves. These cars with seated load have an initial acceleration of 3 m.p.h.p.s. and will reach 20 m.p.h. in 9.5 seconds. They have a free running or balancing speed of approximately 31 m.p.h. on 560 volts.

In Baltimore some very interesting work has been done. A car has been equipped with 26-in. wheel trucks, GE-301 motors, and PCM control arranged for field shunting. The motors have bottom brush holders for easy inspection and adjustment. An automatic self-lapping valve

C. A. Burleson

is used and the regular air brakes are supplemented with track brakes. This experimental car has an unusually fast getaway, being able to make 30 m.p.h in 600 ft. from rest.

The United Traction Company at Albany is operating a modern lightweight, single-end, 44-passenger, front-entrance, center-exit car, equipped with four GE-265, 35-hp. motors. It has foot operated PCM control, foot operated air brakes and air operated magnetic track brakes. Considerable aluminum alloy was used in the body to reduce weight. The complete car weighs 32,000 lb.

With the four-wheel brake becoming general, street car operators must seriously consider the use of the magnetic track brake to increase braking rates, particularly in emergency, so that they not only can keep up with the procession, but also stop with it. Certainly we cannot make maximum use of our higher-powered cars with higher free-running speeds if we do not take full advantage of this extra power for fear we cannot stop as quickly as the next fellow. Any other form of braking is limited by the adhesion between the rail and the wheels. This is not enough to compete with present forms of transportation and should be supplemented especially for emergency. The magnetic track brake adds 25 to 30 per cent additional braking retardation, and this is particularly necessary with a slippery rail.

Trolley buses have been in successful operation for five or six years but it was only recently that the modern trolley bus was put on the map in this country by the Utah Light & Traction Company.

Chicago has recently put 41 trolley buses in operation as feeders to their street car lines. These buses seat 40, weigh about 17,000 lb., are equipped with 40-in. tires and worm ratio of 10.25:1. Two 50-hp. motors, automatic control and four-wheel brakes make a fast, smooth operating vehicle with a balancing speed of about 32 m.p.h. on 560 volts. In Knoxville, four 43-passenger trolley buses with two GE-298 motors and PCM control have recently been put in operation.

The third vehicle to be considered is the gas-propelled bus. Electric drive is now available for 21-passenger vehicles up to double-deck buses seating 67. Larger and more powerful engines are the talk of the day. The Public Service Railway of New Jersey has recently placed in service 170 high powered gas-electric buses which weigh about 18,500 lb., have a 240-in. wheelbase, seat 40 passengers, are equipped with 40-in. tires and a gear ratio of 9.25:1. The engine has a rated horsepower of 150. Direct connected to this engine is a DT-1121 generator which furnishes power to two motors which, in turn, drive the rear axles. On account of the increased size of the engine a new motor known as the GE-1151 was developed. Each of these motors rates 45 hp., continuously.

Digitized by Google

Elimination of Waste

Waste elimination, effected through efforts of supervision, was the subject of this address before the Engineering Association

By A. S. DUNCAN
Assistant Director of Finished Stocks
Westinghouse Electric & Manufacturing Company

THAT we are a wasteful nation has long been known, but the extent to which the industries are involved should be studied because recent investigations show that over 50 per cent of the responsibility for waste can be placed at the door of management, and less than 25 per cent at the door of labor, while the amount chargeable to outside contacts, such as the buying public, trade relationships, etc., is least of all.

Since by far the greater percentage of the responsibility rests with management, it stands to reason that to overcome the evils which tend toward waste through carelessness it must be approached from the angle of supervision.

One of the greatest profit consumers in any line of business is unproductive labor. By eliminating this, or at least reducing it to the smallest possible amount, it will often be the means of transferring many a business from red to black entries. While it is recognized that overhead, or unproductive labor, even of the least skilled type, is possibly necessary to some extent, yet there are often ways and means whereby this can be placed on the same basis as productive labor and get the maximum amount of efficiency at the minimum cost by using incentive methods.

The elimination of material waste can be carried to the same extreme as elimination of excess labor waste. For example, take the classification of iron and steel scrap on just two grades alone—what is known as the "No. 2 Steel" and the "Heavy Melting Steel." The former has a higher value than the latter, and, by installing a pair of shears in the majority of the locations, this can be turned into a very profitable proposition, securing about 60 per cent increase in price for this scrap.

It is always desirable to have master keys and go through the workmen's desks or lockers where they usually store material used in their line of operations. This, however, should be done in their presence, and any material in excess of a two days' supply needed for the task they are actually working on at that time should be returned to stores and credited.

A. S. Duncan

What quantity production is to the successful manufacturers — quantity purchase is to the utilities. Where material is sold on quantity discounts, a vital mistake is made in trying to measure successful operation by turnover to the detriment of economy in purchasing. In many instances it is economy to purchase in quantities ranging as high as a year's supply at one time, providing the discounts warrant it and the possibilities of obsolescence through disuse are reduced to a minimum, and arrangements may be made for protracted deliveries. At this point, co-ordination among engineering, purchasing and storekeeping is positively imperative.

Successful business follows an iron-clad rule of writing off each year, into the depreciation account, a certain percentage of the original costs of buildings, tools, equipment, etc., naturally reducing overhead profits to a certain extent, but at the same time paying taxes on only the actual worth of the investment. The same rule may be followed just as conscientiously in the handling of your frozen investment, regardless of what it may be. In following any rule on frozen investment for the first time, the totals, naturally, will be extremely high and, as such, one fears criticism for what apparently seems to be an error in judgment in ordering material, but after this has been in vogue two or more years, the results will compensate for the anguish expended. I don't know where it is possible to save more money, particularly where the investment is large, than by moving material that has reached the slow moving, inactive, or obsolescent stage to a quick turnover basis.

Slovenly housekeeping, more than any other single factor, is the cause of waste. A motor car manufacturer, having purchased a steam railroad, has been quoted as saying that he paid a very substantial dividend on the total money invested by cleaning up and salvaging material found on the right-of-way. Be that as it may, there is no question but that all of us, regardless of lines of business, are extremely careless in wasting material.

Try this. Go through your own storerooms. Notice how the material is piled and protected. Then go to the department that uses this same material and see how they handle it and if they properly protect it before and during its use. From there go to your salvaging or scrap department. You will no doubt find material there that, instead of being sent back into stock after the day's work or completion of the job, has gone into the day's waste and is on the road to the incinerator, or being accumulated for selling to the scrap dealer.

Also, if you have different storerooms, form a committee among your men and let them visit storerooms other than their own and give constructive criticism on methods of cleanliness, piling, and taking care of material. By this method, you will find that you will be able to secure some startling results. Regardless of the experience of the supervisors, men employed handling material, if interested, often will see things that those in authority, as a rule, will pass over. The principal thing, however, is to drill into them cleanliness and neatness. Keeping material fresh, neat and clean should be one of the principal determining factors for efficiency.

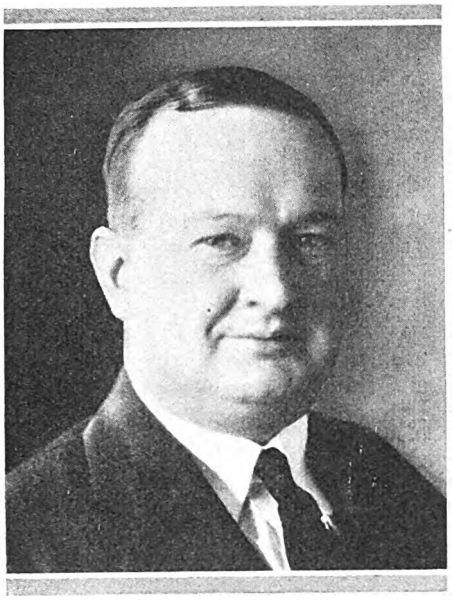
Great progress has been made, and we can go still further by remembering the principles of waste elimination, and the definition of the word "waste" as thoughtless or idle expenditure without hope of return.

Digitized by Google

Claims Men Discuss

WITNESS STATEMENTS

and Related Subjects



W. E. Foley
President

IN THE absence of President W. E. Foley, the sessions of the Claims Association were presided over by J. H. Handlon, claim agent of the Market Street Railway, San Francisco, a past-president of the Association.

"The coming together each year at these conventions affords to the claim agent and members of his department a splendid opportunity to exchange ideas with other claims men from various sections of the country," said Mr. Foley, in his address, which was read to the gathering. "It also enables him to keep abreast of the times, which, in my opinion, is one of the essential factors in the claim agent's work. We are all aware of the value of personal acquaintance in the exchange of business courtesies. Time and again in our work there will arise a situation demanding investigation of witnesses or the settlement of claims in distant cities. It is gratifying to know, when such an occasion arises, that a telephone call or a telegram to a fellow member will bring the desired result." Mr. Foley also made a plea for a wider support from the membership of the work in which the Claims Association is engaged.

The report of the executive committee was read by A. E. Nicoletti, assistant claim agent Key System Transit Company, Oakland, Cal., following which the report of the nominating committee was read. The entire ticket was elected, as follows:

President—C. E. Redfern, United Electric Railways, Providence, R. I.

First Vice-President—J. W. Giltner, Northern Ohio Power & Light Company, Akron, Ohio.

Second Vice-President—L. H. Butterworth, Boston Elevated Railway, Boston, Mass.

Third Vice-President—E. S. Nelson, Pacific Northwest Public Service Company, Portland, Ore.

Secretary-Treasurer—Guy C. Hecker, American Electric Railway Association, New York City.

Executive Committee—Officers and Bert C. Wood, S. A. Bishop, E. J. Paige, and G. T. Hellmuth.

Following the official business of the session, the meeting was turned over to B. F. Boynton, president of the Pacific Claim Agents Association, and a joint meeting was held with that body.

Papers were read on "Bus Accidents—Their Causes and Prevention," by S. A. Bishop, general claim agent Pacific Electric Railway, Los Angeles, and W. R. Sherman, general claim agent, Spokane, Portland & Seattle Railway, Portland, Ore. "With my property, 60 per cent of all mishaps are so-called traffic accidents," said Mr. Bishop. "They are responsible for the major part of the work of the investigation personnel, although their costs are only 26 per cent of the total claim costs. They cannot be prevented wholesale unless perhaps by more thorough training of employees and the stricter application of the rules. The best way I know to get definite results is to investigate each accident, go over the facts with the employee involved, point out to him his responsibility, administer commensurate discipline, demand improvement, and follow up with removal from service if the employee is unresponsive or imcompetent."

In the discussion that followed, P. W. Klabunde, of Milwaukee, described the training road which has been built by his property for the instruction of drivers. W. H. Moore, San Diego, spoke briefly of experiences in that city. Mr. Bishop expressed himself in favor of insuring high-speed buses against accidents and carrying the risk on slow-speed city buses. A. E. Nicoletti, assistant claim agent Key System Transit, Oakland, Cal., stated that his company is working to establish the negligence of automobile drivers in many of the accidents which occur. This relieves the company of responsibility. In some instances it has been found possible to bring suit against the automobile driver as the third party where he was at fault in causing an accident in which a patron of the company or an outside person was injured.

Methods of impressing employees with the importance of obtaining all available witnesses and gathering material facts at the time of the accident was the subject of a paper by Mr. Nicoletti.

He stressed the necessity of securing as many competent witnesses as could be obtained, and particularly of getting the names of persons who, although they might not have been eyewitnesses of accidents, were present.

Another paper on the same subject was presented by J. E. McClain, claim agent Austin Street Railway, Austin, Tex. His paper is given in abstract elsewhere in this issue. In the discussion, Mr. Klabunde stressed the necessity of getting facts as soon as possible after the accident occurs.

People passing by on the street are often better witnesses than passengers, since they may have been able to see the entire occurrence, while those on the vehicle might have had a limited view. People who state to the operator that their testimony would be no good as it would be against the company often prove the most valuable witnesses, he said, and should not be neglected. Distances of the various elements involved are impor-

Digitized by Google

tant. They should be obtained at the time of the accident, as marks on the pavement are obliterated soon afterward, particularly if the traffic is heavy. E. E. Grover, Columbus, Ohio, is opposed to the method described for obtaining witnesses. He feels that if the operators are told they must turn in a large number of names, they may not be particular about whom the people are. Mr. Bishop, on the other hand, does not believe in allowing the trainmen to use any discretion, but advises getting as many names as possible and sending out questionnaires to them. This view was held by a number of other speakers.

"The Value of Motion Pictures in Claims Work" was the subject of a paper by C. M. McRoberts, Los Angeles. Mr. McRoberts demonstrated the effectiveness of motion pictures in establishing facts regarding accidents by showing a number of films which he had taken.

Wednesday Session

The second session of the Claims Association, held on Wednesday afternoon, opened with a report of the committee on uniform negligence law which pointed out that in the opinion of those who drafted a sample bill for the consideration of state legislatures the act would prove constitutional if put before the courts and, if passed, would do away with much unpleasant litigation.

In a paper dealing with the subject of whether the company surgeon should call on the injured immediately after the accident or wait until the liability is determined, M. C. Chapman, Jr., concluded that no hard and fast rule could be adopted. Discussion brought out a majority opinion that where the company is obviously liable, the staff surgeon can prove a valuable emissary of the claims department by calling on the injured as soon as possible. Also the value of taking X-ray photographs at the time was stressed. Such records often prove invaluable at some later date.

The subject of blind accidents and how to handle them was covered in papers by G. T. Hellmuth and J. W. Giltner, abstracted elsewhere.

Two papers dealing with legislation affecting guests of motorists who are injured in accidents were followed by lengthy discussion. There is a strong tendency in most states to absolve the driver of a car from liability when carrying gratuitous passengers. Several states now have laws absolving the operator of a motor vehicle of claims in case of accident except in cases of gross or willful negligence. Oregon is the only state to have passed a law absolving the driver of *all* risk but this act has been declared unconstitutional. It was the opinion of the authors of the papers, as well as several who participated in the discussion, that state legislative bodies are in a receptive frame of mind to pass laws which will to some extent define negligence in such cases. Also the belief was expressed that the time is near at hand when jurors will not be permitted to measure negligence by a flexible yardstick but will have this vital point defined by a commission.

Painstaking Investigation Reduces Fraudulent Claims

Eternal vigilance is the price of protection in dealing with blind or fraudulent claims, according to a statement made before the Claims Association

By G. T. HELLMUTH

Claims Attorney Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.

G. T. Hellmuth

BLIND accidents include accidents that really occur and those that are fraudulent. But in either case intensive work by the claim department is imperatively necessary, and especially so in the fraudulent type of claim.

There lies at the root of this evil of blind accidents a ready cure afforded by training all employees to report any and every accident, no matter how trivial it may appear and no matter how disconnected the company may seem to be from the actual occurrence. It is unfair to the company for any employee to allow an accident to be unreported.

As to the handling of fraudulent claims which so often are based upon "blind" accidents, my company has made it a policy for the past eighteen months to prosecute dishonest claimants wherever we could establish such dishonesty, and we have been successful in jailing some ten or twelve of them in the past year and a half.

In Chicago an index bureau is maintained by the insurance companies and supported by most of the carriers. All members report to the bureau the claimant's name and address, and full records are kept, not only alphabetically by name, but also numerically by street number. The bureau does not rely solely on the reports of its members, but indexes as well personal injury plaintiffs and all law suits commenced in Cook County. Through the help of the index bureau, it has been possible time and again to catch a claimant who is in the habit of making frequent fraudulent claims.

I am a firm believer in the policy of painstaking, thorough and complete preparation of any litigated matter, and in my judgment we can hardly go too far in going into every angle and detail. I feel, also, that haste is liable to make waste, if we are too precipitate in paying a "blind" claim. If it is not yet in the shape of a law suit, I think it ought not to be paid until we have turned the strong searchlight of investigation upon it, and if it is sued upon, we should leave no stone unturned in investigating the facts from every possible angle.

Digitized by Google

Securing the Facts Is the Basis of Accident Investigation

By J. E. McCLAIN
Claim Agent, Austin Street Railway
Austin, Tex.

That unfavorable evidence can be as valuable as that which directly favors the company was the substance of an address delivered before the Claims Association

I AM a firm believer in the great importance of the education and proper instruction of our employees. No operator or other employee of a corporation who has not been instructed in, and taught the fundamental principles of his organization, can render the same efficient service as one who has had the proper instruction and training. The first and most important of these principles which should be conveyed to persons entering the service of a corporation is the principle of elemental facts.

They should be taught that in all cases their first duty to their employer is to gather and present through the proper channels all known facts concerning each particular case, and should supplement this by any other information pertinent to the issue. These facts should be obtained as soon as possible after an accident, and should include evidence unfavorable, as well as that favorable to the company. Failure on the part of the trainman to secure the name of one witness, even, may result in the claim agent of his company making a wrong decision in the case, thereby causing the company the loss of a large sum of money.

Trainmen should be given special instructions in the gathering of evidence at the scene of an accident. Details must be secured at the scene of the accident and immediately after it occurs. A few minutes of delay and at the most, a few hours under ordinary traffic conditions, will tend to erase all traces of the accident on the pavement.

In getting these instructions over to the personnel of an organization in an impressive manner, I know of no better way than for the claim agent to appear before them in person; particularly is this true when there are only a few men to contact. When you get a trainman, who has fallen short in handling his accidents, face to face, and go over the case with him in a friendly and co-operative manner, I feel sure that a great deal more good would result than from any other method which might be used.

When all has been said and done concerning the best methods of impressing employees with the importance of obtaining all available witnesses and gathering material facts at the time an accident happens, the whole thing resolves itself into the matter of education. Give the trainman the proper instruction in the matter of obtaining and presenting all facts pertaining to each and every accident, and we have taken a long stride toward reducing the amount of claims paid because of lack of facts to substantiate our rejection of them.

Blind Accidents and How to Handle Them

By J. W. GILTNER
Chief Claim Agent, Northern Ohio Power & Light Company
Akron, Ohio

Methods of investigating and dealing with the unreported accident are set forth in detail in paper read before the Claims Association

BLIND accidents — sometimes called "no-report accidents"— are those about which we receive our first information from an outside source. It may be advice from an attorney who represents the claimant; it may be a telephone call from the claimant or some neighbor, friend or relative acting for him; it may be a call from the doctor in attendance, the favor and co-operation of whose fraternity we have always tried to merit; occasionally the information is relayed through one of the operators of a following car or bus, and now and then a claimant comes to our office and presents the matter in person.

In all cases except those reported by attorneys, it seems to me the course of our procedure is obvious. The injured person must be interviewed at once, in his home if possible, where, surrounded by his household goods, his family and neighbors assembled, a more accurate estimate of his honesty and reliability is possible.

In this first interview the investigator will go into the claimant's past history and watch intently for previous accidents, injuries, sicknesses and for doctors and lawyers used by himself and intimates. He will learn his places of residence, his employers, his acquaintanceship with attorneys, his experience in law suits, his church and lodge affiliations, the names of insurance companies with which he has carried accident insurance coverage, and will be on the lookout for evidence of a connection between this claimant and other claimants in shady cases handled previously.

Coming closer to the case in point, the investigator has the claimant detail his movements and associates for several hours preceding the accident. Thus a fund of information is secured—much of it possibly is of no value—but no one can tell what can safely be ignored. In it is found all available material for the investigation. In a second interview the correctness of the data given can be checked in the manner referred to previously.

In the case of a blind accident reported by an attorney, it is our practice to recognize and respect all the rights of an attorney to bring his client and supporting witnesses to our office for an interview. In such cases no further discussion is necessary, for the course pursued is identical with that outlined above.

Digitized by Google

Accountants Give Attention to

Budgetary Control

E. H. Reed
President

THAT the era of consolidations and mergers which are constantly taking place in the utility field has created new opportunities as well as new problems for the accountant was emphasized by E. H. Reed in his opening address before the accountants' association. The new obligations imposed upon the profession, according to Mr. Reed, call for a full perspective of the science of accounts to enable one to visualize the enormous transactions which are taking place in the present-day business world.

Perhaps the most important feature of the past year's work of the accountant's group has been the work of the committee on budget control, which has devoted itself to the preparation of a model budget in detail which, when completed, should be of great value to operating managements.

Mr. Reed paid tribute to the committees having in charge the subjects of standard classification of accounts, bus accounting, stores accounting, fare classification, and freight accounting, reports on all of which were submitted at the meeting.

"The Capital Structure of Public Utilities" was the subject of a paper presented by John F. Forbes, resident partner Haskins & Sells, San Francisco. An abstract of his paper appears elsewhere in this issue.

Reports were received from the committee on standard classification of accounts and from the sub-committee on bus accounting. These reports are abstracted elsewhere.

Among those taking part in the discussion were C. C. Vargas, Key System Transit Company, Oakland; P. S. Young, Public Service Co-ordinated Transport, Newark, N. J.; W. H. Scott, Municipal Railway of San Francisco, and A. G. Neal Washington Railway & Electric Company.

How the auditor can most effectively aid his company by becoming an analyst rather than a mere recorder of figures was brought out in a paper presented by Leslie Vickers, economist, A.E.R.A., at the second session of the Accountants' Association. An abstract of this paper appears elsewhere in this issue. Following the presentation of his paper, Mr. Vickers gave an interesting explanation of the attitude and plans of the Interstate Commerce Commission in the matter of cost accounting. It was brought out by Mr. Vickers and also by John F. Moran, Boston Elevated Railway, that the subject of obsolescence has a very important bearing on depreciation accounting. In the absence of the chairman, the report of the committee on budgetary control was presented by C. E. Yost, Delaware Electric Power Company. This report is abstracted elsewhere.

Resolutions were presented on the death of three members of the association, W. G. Ross, F. R. Henry and F. E. Webster.

The report of the committee on nominations was then presented. Officers named for the coming year were:

President—C. E. Yost, treasurer and assistant secretary, Delaware Electric Power Company, Wilmington, Del.

First Vice-President—J. E. Heberle, assistant to president Capital Traction Company, Washington, D. C.

Second Vice-President—E. A. Tuson, general auditor Public Service Co-ordinated Transport, Newark, N. J.

Third Vice-President—C. R. Mahan, comptroller Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.

Members of the Executive Committee—L. T. Hixson, secretary and treasurer, Indianapolis Street Railway Company, Indianapolis, Ind.; R. A. Weston, special accountant the Connecticut Company, New Haven, Conn.; R. L. Crowe, vice-president Los Angeles Railway, Los Angeles, Cal., and J. D. Evans, general auditor St. Louis Public Service Company, St. Louis, Mo.

These officers were unanimously elected and Mr. Yost was installed in the chair. A resolution was passed thanking the retiring president, E. H. Reed, for his services during the past year, and the badge of past-president was presented by O. H. Bernd.

Accountants' Luncheon

DISCUSSIONS of capital charges formed the principal topic at the Accountant's luncheon, which was presided over by President E. H. Reed. Those present took up in considerable detail the subject of cost analysis in connection with construction of track. The procedure necessary in taking up the old track and putting down new track in its place was gone over. In the discussions, methods of segregating charges to capital and to operating expenses were considered.

Fare box collection was another topic discussed. It was told that on one property experts showed methods by which the fare box could be rifled. Due to the analysis made, the manufacturer was able to revamp his design and produce a new fare box which would be theft-proof.

Another subject discussed was checking of material and supplies in connection with orders. The case was cited of an order for major repairs to a group of cars. Material was purchased when, had a check been made with the storekeeper, it would have been possible to use the supply of material already on hand and which has been standing idle for some time.

Those taking part in the discussion were E. H. Yost, Delaware Electric Power Company, Wilmington; E. C. Jolley, San Antonio Public Service Company; W. H. Scott, Municipal Railway of San Francisco; J. W. Glendenning, Commonwealth & Southern Corporation, New York; and others.

Digitized by Google

The Auditor as an ANALYST

Opportunities to do work of great importance and value are outlined in this address before the accountants association

By **LESLIE VICKERS**
Economist
American Electric Railway Association

THE greatest need of our industry today is analysis. You may talk about our need for new cars, for rehabilitated tracks, for new fare structures, for relief from paving and taxation burdens, for traffic regulation and increased public understanding of our business. All of these are necessary and worthy of the stress that is being laid on them, but to discuss them intelligently as applied to any individual property, we need first, the kind of financial analysis that should be made within the auditor's office. It does not necessarily follow that he is the individual who should do it. But he and his associates in the accounting department are the main cog wheels in the machine that can accomplish it. As a matter of fact, there is no one on an electric railway property who can afford not to be an analyst and it is partly because so many of us have accepted things as they are that our industry is in the condition in which we find it today. With certain exceptions, our properties have not done what they should in analyzing service—in finding out what part of it is adequate, what part is inadequate and what part is unnecessary and wasteful; they have not analyzed their patronage to determine whether or not the fares they charge fit the kind of traffic for which they are intended; they have not analyzed the equipment to see if it should be retained or replaced, or whether some alternate form of service should be substituted; and they have not analyzed their operating costs by lines, by routes, by times and by seasons, their shop and track costs by units, or their operating revenues by classes of service or with relation to the new and old investments which they represent. Of course, there are some properties that are doing all of these things and they have approached reasonably close to a thoroughgoing cost accounting basis. Their auditors and accountants are able to tell with a fair degree of accuracy at any moment what the various classes of service are costing, and more than this, they are displaying, in a timely way, the red signals of danger which the operating executive may pass only at his peril. The auditor, by his careful analysis, may not have the final word, but he speaks so authoritatively that he cannot be ignored by those who do have it.

Leslie Vickers

But as an industry we stand in marked contrast with modern manufacturing industry, and indeed with some of the other public utilities as well, in lagging far behind in the matter of cost accounting. Manufacturers must know their individual costs. The time has passed when goods will sell themselves except in certain highly specialized or monopolistic lines—and money is so plentiful, and so eager to find a profitable investment that it soon rushes in to provide competition for the manufacturer who is so careless about his costs and knows so little about his unit margin of profits that he sets his selling price at an attractive point for the establishment of the very competition that will ruin him. A roll call of the industries that have established cost accounting systems and have followed them up to the degree approved by the Taylor Society is a surprising one. It includes the highly seasonal industry of the manufacturer of Christmas cards or the retail distribution of a highly perishable commodity such as milk; it includes ships and heavy machinery builders and confectioners; automobile builders and manufacturers of fly paper; steam locomotive builders and the producers of Eskimo pie. Indeed there seems to be no limit to the application of cost accounting principles, nor yet to the degree of refinement to which they may be carried.

Since I am not an accountant nor an auditor, it is fitting for me to state that I see no great difficulty in the application of very far-reaching cost accounting principles to our industry, and furthermore, I am aware that some up-to-date companies have done much in this direction. But as an industry we must do much more. We must remember that we have a service to sell and not merely to provide. Herein lies one of our weaknesses. Many of us have acted as if our commodity would sell itself, once it were provided. We began our life as a monopoly and some of us have failed to realize that we have developed into a highly competitive business in which we have to provide the kind of transportation that people want, at the time they want it, and at a price they will pay. The old solid iron-tired horse coach could not compete with the horse car on rails; the horse car on rails gave way under competition and development to the cable and then to the electric car, and that vehicle maintained its predominant position for many years until the light passenger automobile came in and demanded smooth surfaced roads, and smooth surfaced roads in turn helped to develop the pneumatic tire. The pneumatic-tired private automobile, operating over roads almost as smooth as our own steel rails, is our great competitor for service today, and we not only have to *furnish* service but we must *sell* service to meet the competition which it creates.

This is neither the time nor the place to insist on the essential nature of common transportation service.

Digitized by Google

Indeed, it is scarcely necessary to assert it at any time or in any place, for it is self-evident and readily apparent to the resident of any city.

But it is both the time and the place to assert the existence of such competition in service, comfort, convenience and price as to force us to the same careful scrutiny of services and analysis of costs as faces the manufacturer of any other competitive article. All of this involves analysis of the most patient kind.

We must all be analysts from the general manager down to the man at the bench; from the superintendent of traffic and transportation to the man on the rear platform; from the auditor to the clerks in the receiving department. But the degree of responsibility varies with the rank of the individual, and this is great in the case of the auditor because of his high standing and his comparative isolation from the routine problems of providing service. It is great because the figures in all the accounts pass before him; because it is his function to make comparisons, and because it is his final authority to pass judgment on the validity of charges and entries.

With such a responsibility and such an opportunity, how can an auditor be content to act merely as a figurer? How can he resist the role of analyst? To remain a figurer is like working in a dingy unlighted office with the grey and uninteresting procession of figures, more figures and more figures passing before his blurred vision, when the opportunity is before him to turn on the light of analysis and scrutiny, breathe life into the columns that face him and see before him an interesting landscape replete with beautiful scenes, living, breathing human beings to be served, and challenging problems to be solved. The analyst's attitude toward his job will lift it out of routine, work-a-day toil into the realm in which students work because they enjoy the search for truth; into the realm of causes rather than the realm of facts; into the realm of things dynamic and full of life and out of the realm of things static and lifeless.

Capital Structures of Public Utilities

In an address before the Accountants' Association the author outlines the various entities of which utilities are composed

By **JOHN F. FORBES**
Resident Partner, Haskins & Sells
San Francisco, Cal.

PRIMARILY the financial structure of any corporation is disclosed by its balance sheet, but there are a great many reasons why the balance sheet of a public utility while apparently similar in form and content to that of every other form of enterprise, must be considered from an entirely different point of view.

In the case of a manufacturing or trading company, for instance, the current financial position is of outstanding significance. In considering the propriety of credit extension to such enterprises, bankers emphasize the relationship between current assets and liabilities since the former normally represent the source from which repayment of loans arises. Logically, the greater the excess of current assets over current liabilities in a given instance, other things being equal, the stronger is the credit position of the borrower. If, as in the past, bankers have usually considered a current ratio of 2:1 satisfactory, a ratio of 6:1 would be proportionately more favorable.

The same method of reasoning however does not apply in the case of the public utility. Indeed the reverse might possibly be true, and for the following reasons: The current assets of any corporation consist essentially of cash, accounts receivable, and inventories, and the current liabilities consist usually of those debts which have to be paid within a twelve-months' period. In an industrial, and in many other forms of enterprise, the cash may be used immediately in the liquidation of the payables. In the normal course of business operations, the conversion of the inventories into receivables and the latter into cash provides the means of liquidating the liabilities. Ordinarily the greater these assets are in relation to the liabilities, the greater is the financial stability of the enterprise.

But in a public utility the amount of cash which may be economically carried is dependent altogether upon the financial plans of the company, and if the accounts receivable exceed the earnings of, let us say, two months, this is probably a sign that the collection department of the concern is not functioning properly or that the company is selling power or transportation, or whatever service it does purvey, in violation of the ordinary rules of business.

The inventories too are not to be converted into cash except in those few instances where appliance sales departments have been introduced into the utility. The inventories usually comprise almost entirely materials and supplies which are to be consumed in the rendering of services to consumers. And the carrying of a large inventory on the part of a public utility may be a sign of great weakness rather than one of strength, for the reason that if the material is not to be used within a reasonable period it represents so much dead investment for the cost of which the company is paying heavily in bond interest or otherwise. So, if a banker is considering the credit possibilities of a public utility, instead of considering the ratios of current assets to current liabilities, he should investigate the daily or weekly or monthly income since that is the source to which he must look for payment.

The banker ordinarily gives little consideration to the fixed assets of the industrials as security for a loan for a variety of reasons. A mill dedicated to the manufacture of cotton stockings might have little value in a silk-stocking era, and the vicissitudes of trade generally serve to render precarious risks based upon such permanent assets. And, too, so-called "capital loans" are likely to become frozen. But the permanent assets of a public utility form an infinitely better security. Even these assets may be seriously affected in their present value, as is illustrated in the effect which the automobile has had upon street car lines, but in the case of the utilities the transition of fixed assets from good to bad is slow.

Digitized by Google

American Association Committees Active During Year

ON ACCOUNT of the shortness of the Association year, due to the convention being held in June instead of October, it was not possible for the committees to complete their assignments to the extent that is done ordinarily. Many of them are engaged on projects that require a greater time than was available, and were able only to report progress. Four of the committees, those on national relations, street traffic economics, employee relations and publicity, prepared printed reports which were distributed prior to the meeting. Their reports are abstracted below. Other committees made oral reports which are mentioned in the proceedings of the sessions.

NATIONAL RELATIONS

REORGANIZATION of the Washington office was described, and the advantages accruing discussed in some detail.

The necessity for clarification of the Interstate Commerce Act with reference to electric railways was pointed out. The principal development during the year was the Supreme Court decision on the Piedmont & Northern case. This has merely thrown the case back into the lower courts without a decision as to its merits. Since the case involves the entire matter of jurisdiction of the Interstate Commerce Commission, including issue of securities, it is of vital importance to find a solution of the problem presented by it.

The bill to control motor buses in interstate commerce is not yet adopted, and certain modifications are necessary to make it desirable after its amendment by the Senate. Certain other legislation proposed is reported on by the committee.

STREET TRAFFIC ECONOMICS

FOUR principal subjects were studied by the Committee on Street Traffic Economics: (1) Possibilities of signal design; (2) parking in neighborhood business centers; (3) use of the public streets, and (4) taxicab operation. The need for proper engineering treatment of traffic problems is growing more acute, states the committee, and railway managements must take the leadership in directing the development of proper traffic control. Public officials and business men will not develop so great an interest in producing freedom of movement on the streets as the alert management of the transportation system. Competent engineering analysis should be undertaken and careful development by concerted planning with the business groups and public officials should be carried out.

On the subject of traffic control and signaling, the increasing accidents in cities are held to be mute evidence of the ineffectiveness of signals and traffic control as now operated. Transit speeds and riding habit have steadily declined in most cities until the industry is now faced with the problem of street speeds of 4 to 6 m.p.h. or even less through business arteries, and even 6 to 8 m.p.h. on long stretches of trunk arteries. Private transport is equally handicapped.

While the relative numbers of riders and pedestrians vary widely in different parts of a city, rarely are different selective methods adopted to meet these situations. Excessive delays have added to freight delivery costs as well as those of city passenger transport.

The committee believes it is quite clear that the total riding habit or demand for transport is increasing steadily with population growth, as indicated by the necessity riding. Far more intensive study of their problems should be given by both city administrations and operating companies.

Specifically, it is necessary to study the street system and main thoroughfare plan with the object of securing the most appropriate classification for various uses, easing bottlenecks, providing by-passes and releasing full traffic capacity of main arteries pending the development of new ones. Complicated intersections should be given individual study. Signal systems already installed, if not of high efficiency, should be replanned to develop full traffic capacity of thoroughfares under control.

The net effectiveness of present traffic enforcement facilities demands study. This has entirely escaped attention, the committee feels. Transit routing and methods should be examined to discover the best means of expediting progressive movements, promoting short-haul riding facilities, simplifying terminal district layouts and releasing the congested districts from unnecessary turning obstructions.

Study should be given to the joint effect of city and state regulations on transport operations; first, physical regulation over city streets and traffic; and second, economic regulation of the state commissions.

It would appear essential that transport companies participate far more actively in this survey and planning work than they have done in the past, for their own good and protection. Co-operative planning should bring quick and positive results.

Considerable space in the report is devoted to a survey of recent experience and effects of city traffic signaling. While the trend is definitely toward the full flexible progressive system, progress is considered slow and piecemeal, with all too little evidence of signaling conceived as a system on a broad master plan. Examples of city systems are cited, and it is held that only two or three of them approached this ideal. The synchronized system, generally inflexible and with too long cycles, reduces street capacity and speeds to almost half pre-signal values. There also is an increase reported in peak power loads.

Some important points in design are taken up in considerable detail. The necessary information to be secured and methods of analyzing it are discussed. Studies of turning movements and of full street filling are deemed desirable. The cycle length and split-timing allotted must be sufficient to pass the traffic.

Advantages of the skip signal progressive system, with only the main crossings of a traffic artery

Digitized by Google

signaled, 1,000 to 2,000 ft. apart, are not believed to be fully understood. With through-street stop signs on the cross streets at intermediate locations there is reasonable freedom of movement. Along with skip stops trunk transit lines show possibilities of increases of speed of 20 to 25 per cent.

Pedestrians will not wait for long cycles in crossing streets, judging from observations of 60,000 instances. More than two-thirds disobeyed the red signal on a 125-second wait and only one-fourth on a 55-second wait. The short cycle gives both high efficiency and pedestrian protection.

Several pages of the report are devoted to a discussion of results of signal surveys in several cities. The synchronous type of signals gave very poor results, slowing down speeds greatly both in rush and non-rush hours. Street car speeds were reduced 25 to 40 per cent. The effect on the crews has been to discourage them.

Parking also was studied in detail. Elimination of parking would not affect business adversely and would facilitate all vehicle movement. Public transportation should be such as to encourage the use of public carriers.

Taxicabs are considered necessary without question, but the committee did not feel ready to make definite recommendations regarding them. Taxicab stands were discussed, and the results in Chicago, Philadelphia and Brooklyn were cited. It was found that the taxicab traffic constitutes from 3 to 8 per cent of all traffic in the congested area and cannot, therefore, be an important factor in causing traffic congestion.

EMPLOYEE RELATIONS

THIS year the committee on employee relations paid particular attention to the personnel side of the industry. It believes that the conference method of training is the most promising avenue of improved public relations and employee inspiration, and the conclusion was reached that the most important business of the committee is to convince the industry that this work must be done. The present committee and its predecessors have tried to prove that education and training of employees are necessary to secure the best results, and to suggest ways in which the education and training can be given.

For several years it has been urged that the principal value of work of this class lies in two fields: the foreman conference for all supervisory officials, and the employee conference on customer contacts or service betterment. At conventions, demonstration foreman conferences have been given and training courses for leaders of such conferences have been conducted. This year the location of the convention and the short time have made it difficult to continue along the same lines, but it has been arranged to provide a demonstration of an employee conference before a group of men especially interested in this method.

For next year it is recommended that the work be divided among a number of subcommittees, each of which takes a phase of the relations of the worker. It also was suggested that instead of continuing the annual training course in connection with the convention, several series of conferences be held at central points in various sections of the country at convenient times. The exact character of these conferences was not determined, but it was suggested that one group be for training leaders for foreman conferences and another for training leaders for salesmanship, public contact or service-improvement conferences of car men and other employees not of supervisory rank.

The appendix of the report contains an article by M. B. Lambert on "Selling the Executive on the Importance of Employee Relations Work." Another appendix gives a complete list of books and articles which have appeared recently on topics bearing directly or indirectly on employee relations. This list was compiled by Henry H. Norris of the committee and Lewis A. Armistead, librarian, Boston Elevated Railway.

Chairmen of American Association Committees

1. J. P. Barnes, Nominations.
2. W. E. Wood, Publications.
3. L. S. Storrs, Resolution on Death of N. F. Brady; Subjects and Meetings; National Relations.
4. C. S. Hawley, Manufacturers' Advisory.
5. H. L. Geisse, Taxation.
6. Paul Shoup, Chas. A. Coffin Foundation Prize.
7. H. B. Potter, Insurance.
8. J. H. Alexander, Membership.
9. J. H. Hanna, Policy.
10. Edward Dana, Employee Relations.
11. T. Fitzgerald, Electric Traction Speed Contest.
12. F. W. Doolittle, Finance.
13. G. A. Richardson, Street Traffic Economics.
14. E. F. Wickwire, Manufacturer's Contact.
15. F. R. Coates, Co-operation with State and Sectional Associations.
16. Dr. Thomas Conway, Jr., National Relations Subcommittee on Depreciation.
17. Barron Collier, Publicity.
18. R. R. Bradley, Interurban Legal.

PUBLICITY

TRAFFIC congestion relief has been the subject on which this year's committee on publicity concentrated. The outstanding feature of this work was the inauguration and regular distribution of a news service entitled "National Traffic Notes." About 1,500 words are sent out about every ten days to all member companies. This is a national summary of traffic congestion relief news obtained through reading prominent newspapers throughout the country and other sources of information.

Supplementing this news service

Digitized by Google

has been a series of posters dealing with traffic congestion which have emphasized the point that public transportation vehicles are the most economical users of street space. Samples of posters are shown in the report. One series includes "stop" and "go" signals with a few pointed suggestions to prospective riders pointing out the advantages of street car service. Another series takes up traffic congestion and shows the futility of blocking the streets with parked automobiles. Other posters have been prepared on special topics for various purposes, including appeals to trainmen.

In order to combat misinformation which has been circulated about the country, the committee prepared a leaflet entitled "The Truth About Electric Railway Abandonments." This leaflet told briefly and truthfully the abandonment situation and also emphasized the unfairness of some newspapers in stressing small town abandonments as being of major importance.

A number of other campaigns were carried on during the year, including the reprinting of a number of addresses which have been made before the American Electric Railway Association and other bodies, and the 10-to-4 shopping campaign. Several new series of advertisements have been prepared for use by electric railways during the year, motion picture films have been distributed and there are now about 30 reels available covering seven subjects. New scenarios are now being prepared.

Resolutions on the Death of

Nicholas F. Brady

YOUR committee appointed to draft a memorial to the late Nicholas F. Brady presents, with recommendation for its adoption, the following:

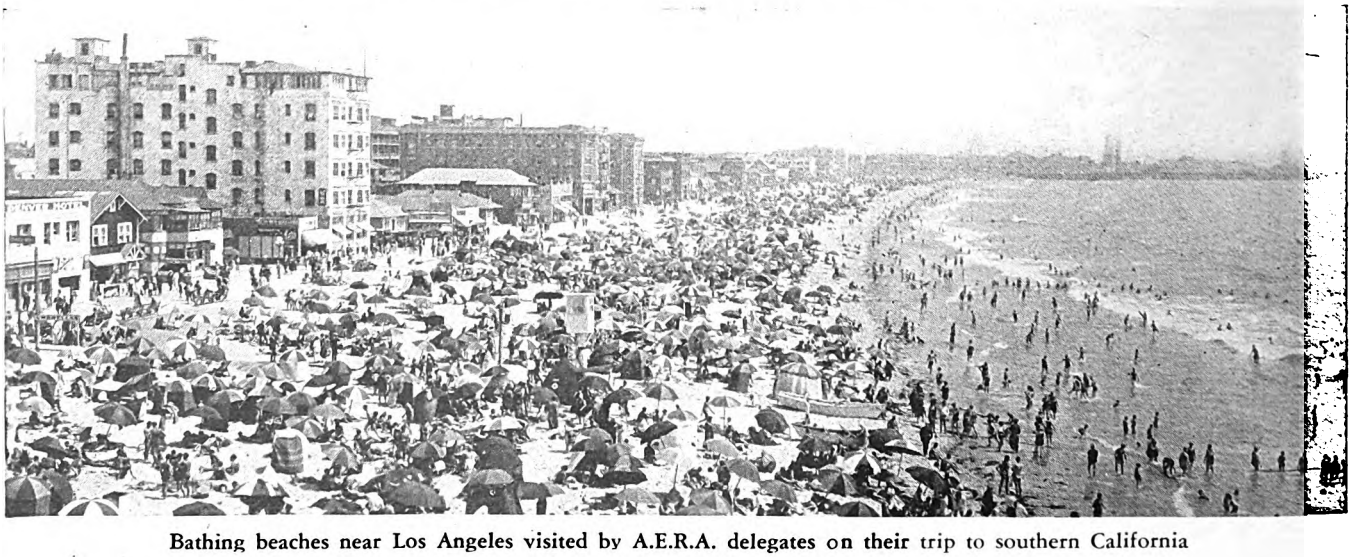
Men in the utility field and in public life were greatly affected at the news of the death on March 27 of Nicholas F. Brady. In his death there passed a national figure—a man of outstanding business attainments, one wise in his benefactions, a devoted churchman, wide in his sympathies and considerate by his tolerance. As for the utility industry, his death removed one of its stanchest adherents. Modest in demeanor, Mr. Brady worked unceasingly to the attainment of corporate projects, but he never lost sight of the human factor upon which they depend for success. Aside from the part that he played directly in the electric railway industry through his various directorships and as an active participant in the affairs of this association, notably as a member of the Advisory Council from its inception, he contributed liberally to the promotion of the humanitarian side through his sponsorship of the Brady Awards, authorized early in 1914 by the family of the late Anthony N. Brady, but subsequently modified to make them more inclusive and revived by him after the war-time period.

Lasting in their impress are these awards made annually by the American Museum of Safety of a gold medal, a silver medal, and a bronze medal to those electric railways which for the year of the awards were judged to have done the most in their respective classes to conserve the safety and health of the public and the employees.

But keen as was his interest in these awards, it was only one of the man's many activities. Never did he lose sight of the complementary aspects of capital and labor. And nowhere was his appreciation of the responsibility of his stewardship better illustrated than the work he did with the National Civic Federation. High corporate, civic and spiritual honors were his because he built up character as well as riches. His corporate work, his benefactions and his humanitarianism proclaimed the man. In his death the American Electric Railway Association lost a wise counselor. It desires now publicly to acknowledge its debt to a benefactor by entering this resolution on its records and directing that a copy of it be sent to his family.

Respectfully submitted,
LUCIUS S. STORRS, *Chairman.*
F. R. COATES,
GEORGE J. MACMURRAY,
Committee on Resolutions.

The Pacific Coast Offers Splendid Beach Recreation



Bathing beaches near Los Angeles visited by A.E.R.A. delegates on their trip to southern California

Digitized by Google

Many Engineering Committees Prepare Reports

COMMITTEE work of the Engineering Association has been proceeding steadily. Much of it has been in progress over a period of several years and thus it was possible to prepare reports for presentation at the convention. The following brief abstracts give a condensed summary of the work accomplished.

Chairmen of Engineering Association Committees

1. L. C. Winship, Heavy Electric Traction.
2. E. M. T. Ryder, Editing of Proceedings.
3. L. D. Bale, Engineering Manual; Subjects.
4. C. A. Smith, Electric Railway Journal Maintenance Contest.
5. F. H. Miller, Nominations; Program.

Heavy Electric Traction

FROM a review of manual section D 100-14, it appears that existing standards for pantograph trolley clearances have been materially outgrown. It is planned to make a study in co-operation with the American Railway Association leading to a revision of this manual section. A specification was submitted for stud terminal rail bonds, which was prepared jointly with a subcommittee of the electrical section of the A.R.A., and which has been approved by the principal manufacturers. The welding of third rails, together with the use of other substitutes for copper bonding, has received consideration and will be developed during the coming year.

Considerable comparative information on oil-electric locomotives has been collected. It also is hoped to prepare a tabulation of operating statistics for these locomotives, and material is now being collected. Further information has been collected on the subject of articulated train operation, and the data sheet giving information on the subject has been revised. This year the locomotive tabulation was given only for machines which were not incorporated in last year's report. It is the plan of the committee now to prepare a complete report on electric locomotives every fifth year only.

Power Division

Power Division Committee Chairmen

1. H. F. Brown, Ferrous and Non-Ferrous Materials.
2. A. J. Klatte, Trolley Voltage Surveys.
3. W. E. Bryan, Power.
4. H. W. Codding, Mercury Power Rectifiers.
5. J. F. Neild, Power Supply for General Purposes.
6. R. H. Rice, Power Contracts.
7. D. L. Smith, Catenary Specifications.
8. H. S. Murphy, Trolley Wire Wear.
9. J. W. Allen, Manual Review.
10. A. Schlesinger, Lightning Protection.
John Leisenring, Distribution System.
L. R. Wagner, Trolley Construction Specifications.

Manual Review—Several of the specifications of this division were reviewed and recommended for revision. An appendix gives considerable information on the subject of trackless trolley.

—❖—

Power Rectifiers—Further operating experience was tabulated and summarized, using the standard log sheet published in the 1928 report. Additions to the bibliography were made, bringing it up to date. It is stated that the installed capacity in rectifiers for the eight months from May 1 to Dec. 31, 1929, was 165,475 kw.

—❖—

Power Contracts—During the year the committee has given its attention to checking details of contracts obtained and preparing from outlines of what a power contract should be. Such an outline is presented as an appendix.

—❖—

Power Supply for General Purposes—Use of trolley voltage supply versus commercial current circuits for general illumination of electric railway properties, operation of shop tools, and miscellaneous requirements was studied. The lighting and motor application as used by various properties was reviewed. Data on lamps and lighting practice were submitted by lamp manufacturers and other information was obtained from tests conducted by operating companies. The committee concluded that from an engineering and operating viewpoint the use of commercial current circuits is desirable, while from an economic viewpoint it may be cheaper to use trolley voltage supply, although this should be balanced against the

Digitized by Google

greater efficiency and flexibility of the utilization of commercial circuits.

—❖—

Catenary Specifications—Proposed revisions of manual section D 102-29, specifications for overhead line material, were included, as were preliminary reports on the study of alloy and composite messenger cables and insulators for catenary construction. A revised tabulation of catenary installations using copper alloy and composite messengers was given showing details of construction used.

—❖—

Trolley Wire Wear—The study of trolley wire wear and breaks, with special reference to breaks due to causes other than normal wear, was continued. It was treated in detail and constitutes the body of the report. Statistical data relative to trolley breaks are brought up to date by including 1929 operating results, and a number of new comparisons covering the period 1922-1929. The committee recommended adoption as standard of the revised specifications for hard bronze trolley wire.

—❖—

Specifications for 600-Volt Overhead Trolley Construction—A progress report only was made. This committee is preparing a revision of manual section D 101-16, which it is planned to bring in conformity with the fourth edition of the National Electrical Safety Code.

—❖—

Lightning Protection—Revision of manual section D 204-15 covering lightning protection for car equipment, stations and line was proposed, as was a revision of manual section E 207-24, in so far as it relates to the same subject.

—❖—

Distribution Systems—Investigation of the comparative cost and reliability of overhead and underground direct current distribution systems was made. The report presents a tabulation which gives some interesting data on the subject. The advantages and disadvantages of the two methods of distribution are gone into in some detail.

—❖—

Ferrous and Non-Ferrous Materials—This report covers principally ferrous and non-ferrous materials used for overhead construction. An analysis was made of the various methods used for protecting ferrous materials, such as coating with other metals, painting, electroplating, and chemical treatment.

Rolling Stock Division

Rolling Stock Division Committee Chairmen

1. H. H. Adams, Car Design.
2. H. S. Williams, Noise Reduction.
3. T. H. Nicholl, Rolling Stock.
4. P. V. C. See, Motor Coaches.
5. Hugh Savage, Current Collecting Devices.
6. W. T. Vivian, Limits of Wear.
7. R. W. Cost, Lighting.
8. J. H. Lucas, Lubrication.
9. E. J. Jonas, Fire Hazards in Shop Practices.

W. C. Bolt, Manual Review.

Motor Coaches—Due to the rapid changes of the industry the committee made no effort to standardize coach design. It did, however, draw up a code for making static tests of bus bodies, which is included as an appendix. It is also working on the determination of how frequently buses should be overhauled. Specifications for motor coach lubricating oils were proposed. Maximum possible rates of retardation were studied, and a tabulation showing the length of life obtained with various brake linings by the Cleveland Railway was included as an appendix.

—❖—

Car Design—A study of car equipment with special reference to appearance, comfort, ventilation and convenience was continued. Particular interest centered around the tests of several types of car trucks. These tests, which were begun more than a year ago, were continued. Charts showing the results up to the present are incorporated in the report.

—❖—

Lighting—Studies on the subject were continued during the year. Investigations were made on the use of dash illuminating headlights. Recommendations were given on interior color finishes for cars, burning position of lamps and the prevention of reflections on the windshield of the car due to the interior lighting. Recommendations were also made on the installation of lighting fixtures under interior baggage racks of motor coaches.

—❖—

Lubrication—Four reports of experimental work being done in connection with the use of light viscosity oils have been received by the committee. Since there was considerable variance of opinion, the committee has presented a report of progress only and has not made public the data received.

—❖—

Fire Hazards in Shop Practice—Study of fire prevention with special reference to spraying nitrocellulose lacquer and other inflammable finishing materials used in railway car painting was continued. It was pointed out that certain of the rules of the N.F.P.A. are inconsistent.

—❖—

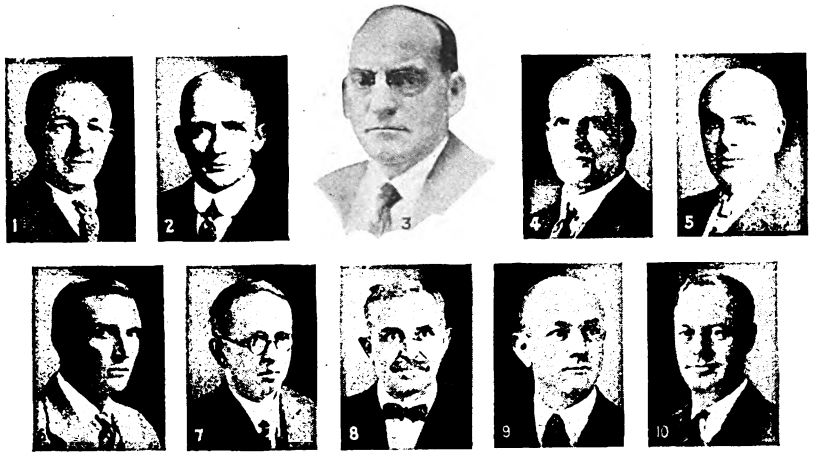
Noise Reduction—Further tests were made on a new type of cushion car wheel and comparisons made with a standard car wheel. These showed the improvements as regards noise obtained by use of the cushioned wheel. Tests were also made to show the value of celotex as a soundproofing medium compared with felt.

—❖—

Limits of Wear—An effort was made to arrive at some reasonable limits of wear on car journals, journal boxes, bearings and pedestal guides, both from the standpoint of the operator and from calculations. Maximum allowances have been selected which would not permit trucks and axles to rotate through a sufficiently large angle to allow the wheel flanges to drag on the rail. Definite limits of wear for railway motors and truck parts were recommended.

Digitized by Google

Way and Structures Division



Way and Structures Division Committee Chairmen

1. C. L. Hawkins, Track Construction.
2. E. M. T. Ryder, Special Trackwork.
3. C. A. Smith, Way and Structures; Wood Preservation.
4. C. H. Clark, Track Gage.
5. C. F. Gailor, Arc Welding.
6. S. C. Baker, Pavement.
7. H. S. Williams, Rail Corrugation.
8. C. A. Alden, Rails.
9. W. R. Dunham, Jr., Manuel Review.
10. M. W. Rew, Motor Bus Garage Design.
J. I. Catherman, Weed Elimination.
P. A. Kerwin, Alloy Steels for Special Trackwork.
P. J. Mitten, Wheel and Rail Contours.
W. A. Underwood, Foundations for Special Trackwork.

Manual Review — Recommendations were made to bring manual section W 25-23, specification for steel track spikes, in line with the latest specifications of the A.S.T.M. on the same subject. A change of manual section W 11-21, standard dimensions in switches and mates, was also recommended.

—◆—

Special Trackwork—Study of the design of tongue switches was continued. Designs were submitted with the report for a 75-ft. lateral, a 100-ft. equilateral, and for 9 in. deep work. A design for expansion joints and girder rail to be used in paved track was worked out but was not submitted as the committee desired also to work out a design for use in open track before reporting.

—◆—

Wheel and Rail Contours—A study of cylindrical wheel treads versus conical wheel treads in conjunction with flat head versus curved head rails was taken up. The committee has attempted to determine the reason for the use of a conical tread, to locate properties where a cylindrical tread has been tried, and to obtain information as to the results of such trials. The history of the conical tread was traced from the earliest days of railroads. While only one American electric railway property was located on which cylindrical treads are used, there are several in Europe.

—◆—

Wood Preservation — Specifications for the maintenance of pole timber and structures were presented. Further studies of the actual economies obtained through the use of treated timber were reported on. The study of wood preservatives other than creosote and zinc chloride is becoming more important, and it was continued. Possibilities of a combination preservative and fire preventive treatment for timber was given consideration. It is believed by the committee that with increased use, the relatively high cost of the fire-proofing treatment can be reduced. Preservative treatment for timber for use in car construction and maintenance was discussed.

—◆—

Arc Welding—Studies were made of various types of welding rods. A report was submitted giving proposed rules and instructions for training welding personnel. The committee also has given considerable thought to the collection of all available welding information which would be of any interest or use to electric railway employees.

—◆—

Alloy Steels for Special Trackwork—A group of tests was undertaken on surface welding of the three types of alloy steels now in use in special trackwork and to complete the work started last year in the investigation of thermit welding of chrome-nickel steel. A detailed description of the tests and the results obtained is given. The results of the several tests on surface welding of alloy steel were averaged and tabulated so that a comparison may be made conveniently and conclusions drawn. Another subcommittee developed a method for making wear measurements on individual pieces of special trackwork installations, so that all wear data should be recorded on a comparable basis. On the subject of heat-treated rail and intermediate manganese rail, it is stated that these materials offer interesting possibilities along the line of increased hardness, wearing qualities and resistance to rail corrugation.

—◆—

Pavement—It is believed that in view of the large expenditures for paving and of the increasing demands of vehicular traffic and increased cost of this part of the track structure, up-to-date information should be secured and made available to way engineers.

—◆—

Motor Bus Garage Design—A proposed outline of operating bus garage layouts was made, so that the operator may determine from it the various elements that are necessary in producing a satisfactory garage for bus service. It was recommended that the outline be approved as recommended practice for inclusion in the Engineering Manual.

—◆—

Rail Corrugation—A voluminous report was presented. It contains a collection and study of data pertaining to deflections under load and of the computed probable vibrations resulting from these deflections. The study shows that paved track is much stiffer than open track, and that in paved track the natural period of vibration is a probable contributing cause to rail corrugation. A short study of car nosing, together with a presentation of the data which the committee has collected, was made. Indications are that the effects of nosing may momentarily increase wheel loads by as much as 50 per cent. The report also includes summaries of the work done by the Canadian and the International Association committees on the same subject.

—◆—

Rails—Branding rails was discussed, and it was recommended that the subject be continued. Manual section W 16-24, specification for carbon steel rails of standard section, was reviewed and was submitted to the association for letter ballot. The relation between rail wear on a given section of track approaching stops

Digitized by Google

and between stops was studied to develop the connection between the amount of such wear and the volume of traffic, weight of equipment, rate of speed, etc. Fishing between the association's standard 7-in., 122-lb., grooved girder rail and the standard 7-in., 140-lb., girder guard rail was investigated.

Purchases and Stores Division

Manual Review—Several revisions of the Engineering Manual sections dealing with this subject were proposed. No changes are recommended in the classification of scrap material. The committee has prepared an index for the A.E.R.E.A. classification for materials and supplies. This is submitted as an appendix.

—◆—

Investments in Materials and Supplies at Cost of Operating Stores—A study was made to determine what is included in the account of materials supplied by the various member companies, what is charged to the account of stores expenses, what is the relation of stores expenses to gross earnings and other items, and what are the physical or operating circumstances which have a special influence on the subject. A questionnaire was sent out and replies are now being received. It was not possible to draw deductions from these in time for the convention.

—◆—

Standardization and Simplification of Stock—This committee has only recently been organized and arrangements are being made to obtain information on the subject.

—◆—

Materials and Supplies Control—The importance of proper control of stocks was stressed by the committee. Recommendations were made relative to proper methods of handling stock.

1. C. A. Harris, Standardization and Simplification of Stock.
2. W. E. Scott, Unit Piling and Standard Packages.
3. A. L. Fischer, Purchases and Stores.
4. W. S. Stackpole, Stores Investment and Costs.
5. A. A. Ordway, Pricing Methods and Records.
6. J. Fleming, Manual Review.
7. E. F. Kelley, Material and Supplies Control.

Purchases and Stores Division Committee Chairmen

T. & T. Committees Active

FIVE committees of the American Electric Railway Transportation and Traffic Association were continued during the past year for further study, research and collaboration. The available time for study was foreshortened but all of the committees made real progress in the subjects assigned. A sixth committee, covering the subject of operating economics, was created in the belief that an assignment of this scope would be beneficial and profitable. This report, along with five others that were completed, are herewith presented.

TRANSPORTATION EMPLOYEE

ANALYSIS of the transportation job, with the correlated subsequent supervisory and employee training, and a study of proneness to accidents are the items to which special attention is given in the report of this committee. The study of accident proneness covers several factors affecting efficient operation, although it is recognized that accidents comprise the more definite unit for measuring the faults. In seeking the fundamental cause for this proneness, the committee found a need for improved selection of trainmen and coach drivers, proper choice of the supervisory employee, and better training of both.

For the subject of accident proneness the committee concludes that there is definite need for intensive supervisory training and job analysis, that training should follow job analysis, and that selection and training of employees should be given greater study.

Under selection of the transportation employees, the committee discusses the preliminary interview of applicants, high physical standards and testing applicants for proneness to inefficiencies. A good supervisory staff, according to the committee, should be made up of high-grade men, properly trained.

MOVEMENT OF THE VEHICLE

COMMUNITIES and transportation agencies are more keenly aware than ever before of the fact that increasing private automobile usage presents a great and permanent problem. In this report the committee signalizes the work of the electric railways in solving the problem and analyzes the private automobile, parking, signals and traffic control, and equipment.

Under the first subject, the private automobile, the committee concludes that the most severe aspects of automobile competition have not been felt by collective transportation facilities and that the future may show a similar distribution to that now found, with some probable shifts toward collective transportation, with increases in street congestion and with improved transportation methods.

In the section devoted to the parking problem, the committee holds that parking is a privilege that may be tolerated where it does not interfere. It should be regulated to promote safety and an equitable distribution of space.

SMALL CITY OPERATION

THE report of the committee on small city operation outlined the procedure followed in securing additional data and analyzing the individual subjects of operating methods, merchandising, competition, bus substitution, franchises, operating economies, taxation and financial structure.

Questionnaires covering these were sent out during the year and the re-

Digitized by Google

sults interpreted at a three-day session. Conclusions arrived at in this meeting formed the major part of the committee's report. Among the significant statements were: Properties where most attention has been given to prices and selling service have obtained the best results; transportation must be supplied in the form in which the public wants it and at a price which is competitive; merchandising must go farther than advertising, the entire organization must be groomed to sell the service; buses offer several advantages which must not be overlooked; results of several companies indicate it is possible to adjust operating expenses to a very low level of earnings.

"There is no magic formula for the success of the small-city transportation property," the report concludes; "Individual conditions are controlling and must be expertly analyzed. The management cannot miss a single opportunity to provide joint service, secure added economies, or improve operating conditions. The greatest need is for skilled merchandising and all that is implied by it."

OPERATING ECONOMICS

FIVE broad subjects are covered by this committee: (1) Those operating practices which have been found beneficial on one or more properties, (2) use of one-man cars, (3) substitution of buses for street cars, (4) business-getting, and (5) fares.

In analyzing operating practices the committee sets forth those applications of modern methods and practices which will, first, increase the gross revenue of the operating company, and second, decrease the operation of maintenance costs.

Some companies have succeeded in stopping the annual decline, and in several outstanding examples have actually increased their riding and revenue during the past few years. The ways and means of accomplishing this satisfactorily are listed.

The operating practices which have resulted in decreased cost for operation and maintenance, as listed in the report, are those which, because of the fact that the individual saving may be relatively small when expressed as a percentage of gross revenue, are frequently overlooked but which, taken as a whole, represent a substantial saving to the industry.

On the subject of one-man cars, the committee expresses the opinion that the substitution of one-man cars for two-man cars has become more than a trend and that there are very few, if any, street car lines, except perhaps in the very largest cities, that cannot be successfully operated with one-man cars.

Chairmen of Transportation and Traffic Association Committees

1. C. W. Wilson, Movement of the Vehicle.
2. W. H. Boyce, Nominations.
3. C. A. Smith, Way and Structures; Wood
4. J. R. Ong, Operating Economics.
5. A. C. Spurr, Small City Operation.
6. L. C. Datz, The Equipment.
7. C. D. Smith, Transportation Employee.

W. W. Holden, The Passenger.

For the purpose of its study of the economics of bus substitution for street cars, the committee cautions against the comparison of modern buses and old-fashioned street cars, and suggests that an estimate be made of what savings in operating costs could be made by the use of modern cars.

To determine the extent to which aggressive merchandising methods are now being employed, a questionnaire letter was sent out. A decided declaration was made by many of the companies that a high quality of service must be maintained before results can be obtained from merchandising methods.

The study of fares was confined to an examination of the trend in revenue passengers in eight cities of the United States, each with more than 500,000 population, from 1926 to and including 1929. The results are presented graphically and analyzed in some detail.

THE PASSENGER

DETERMINING the education of the public in general as well as the patrons of public transportation toward the service which electric railways are rendering was considered a necessary field of investigation by this committee. Accordingly it organized and started a plan of research to find out why people use or do not use public transportation. This might be termed a quantitative or market analysis.

To establish a scientific and uniform method of making market analyses the electric railways selected a man with considerable experience in this work, Dr. W. J. Reilly, to visit a number of different properties and to assist and instruct them in the making of such an analysis. The plan is for Dr. Reilly to spend a period of from two to four days in instructing the local men in the methods of securing information and analyzing results. A sufficient number of companies accepted the plan to assure its accomplishment, but the work had not progressed sufficiently at the time of the report to present the final results.

EQUIPMENT

THE effect on revenues and operating expenses of new and rehabilitated cars; the size, type and character of units most suitable for various classes of service, and the accessories necessary for the safe and convenient operation of buses and trolley buses, are the individual subjects covered by the committee on equipment.

The first subject is divided into two parts, the effect on revenue, and the effect on the maintenance and operation accounts.

The facts developed by a study of individual cases where new cars were substituted for older equipment, together with the general comparison of 81 companies, 41 of which had new cars, admits of but one conclusion—new cars or cars that have been modernized increase passenger revenue by an appreciable per cent.

It is claimed that (1) operation of light-weight, modern cars shows a saving in power; (2) new cars increase schedule speed; (3) operation of modern cars reduces platform costs; (4) maintenance of modern cars is not only less for the first few years but also remains lower than for the old type of cars; (5) lighter cars show a saving in maintenance-of-way; and (6) safety features of new cars result in fewer accidents.

The recommendation is made on bus equipment that standard heating and ventilating systems and standard accessories be developed as parts of body design.

Digitized by Google

ACCOUNTANTS' and CLAIMS Associations Active in Committee Work

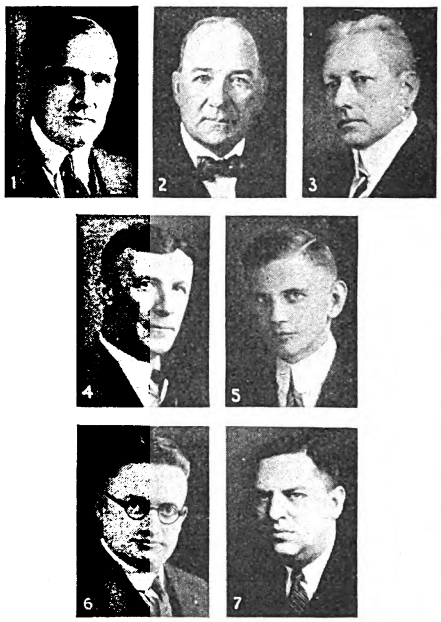
BOTH the Accountants' Association and the Claims Association committees prepared useful reports during the year. The former association completed several investigations which could not be finished in time for the Atlantic City convention last fall, at which time only reports of progress were made. The Claims Association continued with the same committees which have been functioning for some time.

Abstracts of the reports made public are published in the following paragraphs.

STANDARD CLASSIFICATION OF ACCOUNTS

DURING the past few years several interpretations of interest have been issued by the bureau of accounts of the Interstate Commerce Commission, and as these interpretations have not been published, the committee's report consisted principally of an appendix in which these rulings were set forth in detail. In the matter of the "unit of property," it has been ruled that the term should be restricted to property items the cost of which are ordinarily recorded separately in the property accounts. An important section of a continuous structure should include all of the elements of that particular structure and should not be applied to only one factor of the same. For instance, the complete electric motive equipment of a car should be considered a unit. Rails and paving are but factors of a continuous structure, and the accounting pertaining to the replacement thereof, where betterment is involved, is specifically provided for in the interpretations. The report of the committee, together with the appendix, should do much to clarify many disputed points in accounting procedure.

With a view to ascertaining the extent to which its recommendations had been adopted, the subcommittee on bus accounting had circularized the industry with the aid of the association's headquarters staff. From the replies received it would appear that the classification, slightly modified, is being adopted by a great majority of member companies, as well as by a considerable number of state regulatory bodies. The returns indicate that there is a heavy preponderance of opinion in favor of setting up a separate group of accounts for retirement expenses, but opinion on rentals was about evenly divided. Preliminary discussions have been held with the bureau of accounts of the Interstate Commerce Commission looking toward the promulgation of a classification for motor bus operating companies by that body. A mutually satisfactory understanding appears to have been arrived at, and a classification has been tentatively framed which will be in harmony with the committee's standard classification, as well as with that adopted by the National Association of Railroad and Utilities Commissioners.



Chairmen of Accountants' Association Committees

1. **Walter Shroyer**, Freight Accounting.
2. **T. P. Kilfoyle**, Nominations.
3. **M. W. Glover**, Standard Classification of Accounts.
4. **H. R. Bowie**, Stores Accounting.
5. **R. G. Smith**, Budgetary Control.
6. **W. L. Davis**, Representative at Accountants' Association at Annual Convention of National Association of Railroad and Utilities Commissioners.
7. **E. A. Tuson**, Bus Accounting Subcommittee of Standard Classification of Accounts; Fare Collections.

R. O. Crowe, Subjects.

BUDGETARY CONTROL

THE purpose of the budgetary control committee has been to determine the extent to which budget systems are now being used by member companies, and to devise a standard form of budget procedure in case there should appear to be any need for it. A widely circulated questionnaire was responded to by comparatively few companies, but the replies received indicated that a considerable number of properties already have budget control of revenues, operating expenses, cash requirements, taxes, and construction expenditures. The general impression gained from the replies returned was that the companies making use of the budget system find it extremely helpful and have experienced no disadvantage other than the expense of maintaining the necessary records. It is, perhaps, significant that only two companies discontinued budget systems after they had once been established.

Of the 93 companies replying to the questionnaire, 54 indicated that a further detailed study by the committee should be recommended. Reference was also made in a considerable number of replies to the excellent work of a similar committee of the National Electric Light Association, with the recommendation that if further study is to be carried on by the committee, the work of the N.E.L.A. committee should be carefully studied.

BUS ACCOUNTING

SINCE reporting to the last convention, the committee has undertaken the circularization of the country, first, to obtain accurate information as to the use of the association's bus classification; second, the extent of its official adoption by regulatory bodies; and, third, the attitude of bus operating companies toward the changes proposed in the classification as to rentals and retirement expenses

Digitized by Google

in the committee's reports to the last two conventions.

Information has been received from all but three states, and it has been found that the committee's classification, slightly modified in some instances, has been adopted by Maryland, New Jersey, Missouri, Vermont, Georgia, Oklahoma, Alabama, Florida, Wisconsin, Tennessee and the District of Columbia. Minnesota also accepts reports filed upon the basis of this classification as well as another classification promulgated by the state.

Of the other states, only Pennsylvania and California have adopted classifications designed to cover major bus operations, although eleven other states have classifications for the use of small operators. Three states, Texas, Iowa and Wyoming, were not heard from, twenty have no standard classification, and Delaware has no state regulatory body.

The committee finds further that of the member companies circularized nearly all use its classification except the Pennsylvania and California companies.

The response to the inquiry for opinions on the proposed changes in the classification resulted in a heavy preponderance in favor of setting up a separate group of accounts for retirement expenses. The vote on rentals was evenly divided.

Preliminary discussions have been held with the bureau of accounts of the Interstate Commerce Commission looking toward the promulgation of a classification for motor bus operating companies by that body. A mutually satisfactory understanding seems to have been arrived at and a classification has been tentatively framed. This classification will be in harmony with the standard classification, which has already been adopted by the National Association of Railroad and Utilities Commissioners.

SAFETY

IN PRESENTING its report wherein it was recommended that the safety committee of the Claims Association be discontinued, the committee took the view that the interest of the Claims representatives in the subject of safety arise only after the occurrence of accidents, and that accident work is usually in the hands of specialists, in consequence of which there was no need for a safety committee organization within their association. Those members of the association who are taking an active interest in accident prevention work upon their properties, according to the report, attain success only where managements and other operating departments give wholehearted co-operation in such efforts. The committee held, further, that there can be no success in any accident prevention work without the co-operation of managements and other operating departments.

The committee made the further recommendation, however, that a safety committee be appointed by the American Association, with a membership to be composed of representatives of managements and the several operating departments, including the claims departments. Such a committee, according to the report, would limit its activities to actual safety matters, such as legislation in the interest of safety, dissemination of information regarding safety devices, standardizing protection for crossing and train operation, etc., omitting further consideration of such matters as uniform classification, uniform accounting, chargeable and non-chargeable accident definitions, and other such matters not actually concerned in real accident prevention.

CLAIMS DEPARTMENT PRACTICES

THE committee on claims department practices pointed out in its report that the non-uniformity of practice makes it impossible for properties to compare results and thereby profit by an interchange of information. A recommendation put in the form of a motion for the appointment of a representative committee to standardize all claims department reports was unanimously passed.

Considerable preliminary work was done by the committee and a questionnaire was sent out. Replies were received from a considerable number of representative companies, but it was felt that only a report of progress should be made at present.

Downtown San Francisco

Chairmen of Claims Association Committees

1. Wallace Muir, Nominations.
2. J. S. Kubu, Uniform Negligence Law.
3. J. H. Handlon, Subjects.
4. B. C. Wood, Claims Department Practices.
5. P. W. Klabunde, Safety.

UNIFORM NEGLIGENCE LAW

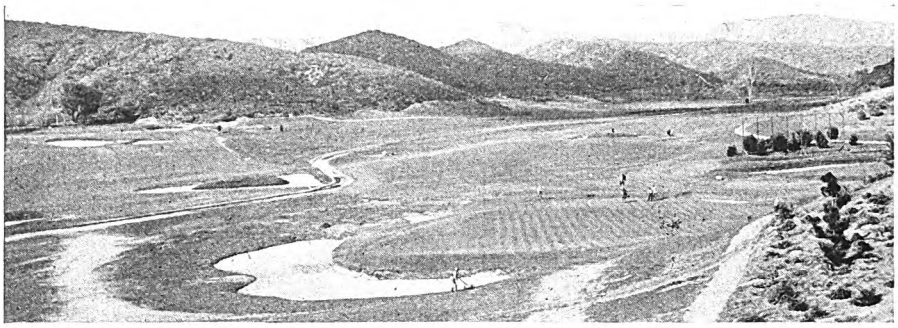
IN ITS report on the uniform negligence law the committee made it plain that it had confined its endeavors to an attempt to determine the constitutionality of the imputed negligence act, as drafted by a previous committee. Consultation was had with counsel, not alone in the street railway industry but from the steam railroads and the insurance companies as well. The general opinion was that the constitutionality of such a case had practically been established in a recent decision of the United States Supreme Court involving a Connecticut statute which, in effect, released owners of motor vehicles from responsibility for injuries to passengers therein. There remained, however, the question of political interference with the passage of such an ordinance, this being a debative point the committee was unable to solve.

Although commendable progress had been made in classifying procedure, the committee on claim department practices was not in position to render a final report, and asked that it be continued for another year.

Digitized by Google

How the Convention Guests

Were Entertained



Many delegates took advantage of the opportunity for golf

EXTENSIVE planning on the part of the entertainment committee provided a very complete program for the A.E.R.A. delegates and their families while in the convention city and in southern California. Interesting events were scheduled for almost every time of day, and many availed themselves of the opportunity of combining pleasure with business.

Numerous automobile trips, special concerts in the hotel lobbies, and golf were scheduled for every day of the convention. Golf privileges at the principal San Francisco Clubs were extended to registered delegates of the convention.

Automobile trips were made on Sunday afternoon and Wednesday to interesting points in the metropolitan area of San Francisco. The Wednesday trip, planned especially for the ladies, included Taits-at-the-Beach where the party had luncheon. Leaving this interesting spot, the party followed the Skyline Boulevard down the Peninsula to Stanford University, where the famous Stanford Memorial Chapel, the home of President Hoover and the University's huge stadium were viewed. From here the group went to the beautiful Los Altos estate of Mr. and Mrs. Paul Shoup, where tea was served.

On Monday afternoon an informal reception and tea for the ladies was given at the Laurel Court of the Fairmont under the sponsorship of the hostess committee, headed by Mrs. Paul Shoup. In the evening the Advisory Council banquet was held.

Tuesday morning was set aside for shopping tours for the ladies of the convention. Many took advantage of this opportunity to visit some of San Francisco's leading shops, including those in Chinatown. In the afternoon two interesting features were enjoyed, an inspection of the 600-ft. California relief map on the second floor of the Ferry Building, and a boat trip on the San Francisco Bay, extended through the courtesy of E. H. Maggard, vice-president and general manager of Southern Pacific-Golden Gate Ferries, Ltd.

One of the outstanding social events of the convention was held Tuesday evening in the Venetian Terrace of the Fairmont Hotel, portraying "A Night in Hawaii." Nothing was left undone to place the guests in this atmosphere. The feature of the evening was the entertaining by Johnny Nobles' Orchestra from the Royal Hawaiian Hotel at Honolulu and the Hawaiian Girls' Glee Club, featuring Lani Ruttmann, hula dancer in "White Shadows of the South Seas."

An atmosphere of the days of Old California just before and during the discovery of gold in 1849, was provided at the grand ball, held at the Fairmont Hotel Wednesday evening. The decorations were particularly novel and fitting for the occasion and lent much to the effectiveness and enjoyment of this event. During the evening a number of special dances were given, including the tango, a cakewalk, a Spanish waltz, and a spirited adagio. Music for both the Grand Ball and a "Night in Hawaii," was furnished by Anson Weeks' Orchestra of the Hotel Mark Hopkins.

Mention should also be made of the entertainment provided for the delegates en route. The White Special, leaving Chicago on the evening of June 17, made stops at St. Paul and Portland. Many availed themselves of the opportunity to see the Twin Cities in a bus ride from St. Paul to Minneapolis. At Portland, the party was royally entertained for a full day by the Pacific Northwest Public Service Company. A 200-mile automobile trip along the Columbia River scenic highway to Hood River occupied most of the day. On the return, the party stopped at Eagle Creek for a mountain trout barbecue.

The Red Special party was entertained at St. Louis, Kansas City, Colorado Springs, and Salt Lake City. At the first city, the delegates were taken to inspect the Lindbergh trophies and to hear part of the Municipal Opera program. At Kansas City the delegates were given a breakfast at the Kansas City Athletic Club and shown the points of interest in the city.

Near-by spots of scenic beauty were visited at Colorado Springs via automobile. A five-hour stop was made at Salt Lake City, permitting the party to inspect the trolley bus system there and view several interesting places. The Blue Special was scheduled for making the trip in a minimum of time and had no stopovers.

Friday found a number of delegates at Del Monte for the A.E.R.A. Pebble Beach eighteen-hole medal handicap golf tournament. Ephraim Brown, Ohio Brass Company, won with 79. Others spent the day at the Yosemite Valley.

Almost 300 enjoyed the tour of Los Angeles and vicinity on Saturday. Among the places visited in the morning were the city hall, Elysian Park, Luna Zoo, San Gabriel Mission, Pasadena residential districts and Glendale. At noon members of the party were entertained at Fryman Rancho with an old fashioned Spanish barbecue. Individual buses then went to the motion picture studios where the party saw how sound films are made by Metro-Goldwyn-Mayer, First-National, Warner Brothers and Pathé. The trip was concluded with a visit to the beaches, to Beverly Hills and to the outlying residential suburbs.

That evening there was a farewell reunion in the nature of a dinner dance at Brandstatter's famous cafe, Montmartre, Hollywood, participated in by 34 members of the party.

Digitized by Google

Monthly and Other Financial Reports

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Market Street Railway, San Francisco, Cal.					
April, 1930	798,970	637,121*a*	.....	131,849	76,480
April, 1929	829,328	697,827	.....	131,501	68,908
12 mo. end. Apr., 1930	9,571,797	7,997,225*a*	.....	1,574,572	883,163
12 mo. end. Apr., 1929	9,632,131	8,256,047	.....	1,376,084	757,843
May, 1930	792,536	675,407	.....	117,129	61,527
May, 1929	819,405	683,499	.....	135,906	77,101
12 mo. end. May, 1930	9,544,929	7,989,134	.....	1,553,795	867,590
12 mo. end. May, 1929	9,610,060	8,229,538	.....	1,380,522	646,735
Northwestern Pacific R.R., San Francisco, Cal.					
April, 1930	434,145	446,367	35,854	*48,076*	*55,856e*
April, 1929	432,399	462,699	38,236	*68,540*	*68,419e*
5 mo. end. Apr., 1930	1,580,812	1,728,614	145,002	*292,947*	*310,242e*
5 mo. end. Apr., 1929	1,653,842	1,773,673	152,945	*272,823*	*282,470e*
Capital Traction Company, Washington, D. C.					
April, 1930	375,237	260,692	29,868	87,396	57,675
April, 1929	380,996	254,470	31,691	99,196	68,451
4 mo. end. Apr., 1930	1,415,143	1,018,405	109,344	294,350	174,221
4 mo. end. Apr., 1929	1,452,391	1,011,768	114,096	335,619	216,386
May, 1930	369,413	256,036	29,934	83,746	53,985
May, 1929	389,304	263,059	32,076	94,727	64,814
4 mo. end. May, 1930	1,784,556	1,274,441	139,278	378,097	228,206
4 mo. end. May, 1929	1,841,695	1,274,828	146,172	430,347	281,200
Jacksonville Traction Co., Jacksonville, Fla.					
April, 1930	91,163	71,000	9,115	10,415	.....
April, 1929	97,394	77,495	9,153	10,268	.....
12 mo. end. Apr., 1930	1,115,767	910,325	107,314	91,721	*65,138*
12 mo. end. Apr., 1929	1,183,310	955,306	106,735	114,758	*46,707*
Honolulu Rapid Transit Company, Honolulu, T. H.					
April, 1930	85,064	46,271	8,819	29,974	18,295
April, 1929	87,658	51,783	10,616	25,259	15,054
4 mo. end. Apr., 1930	344,390	206,351	35,277	107,086	58,688
4 mo. end. Apr., 1929	354,598	203,715	42,464	113,007	68,114
May, 1930	88,437	50,810	8,819	31,008	19,704
May, 1929	88,382	51,892	7,932	29,569	18,346
5 mo. end. May, 1930	432,827	257,161	44,096	138,095	78,392
5 mo. end. May, 1929	442,981	255,608	50,395	142,578	86,461
Chicago Surface Lines, Chicago, Ill.					
May, 1930	5,012,190	3,986,513*a*	.....	1,025,677	831,499*d*
May, 1929	5,354,248	4,157,362*a*	.....	1,196,885	902,826*d*
United Railways & Electric Co., Baltimore, Md.					
April, 1930	1,449,416	974,816	143,143	341,249	67,093
April, 1929	1,423,427	969,800	134,569	332,099	43,876
4 mo. end. Apr., 1930	5,706,277	3,892,272	563,994	1,296,243	190,549
4 mo. end. Apr., 1929	5,558,852	3,827,834	553,037	1,233,594	97,222
May, 1930	1,457,181	982,696	142,669	341,491	73,214
May, 1929	1,463,365	998,615	132,666	346,656	64,753
5 mo. end. May, 1930	7,163,458	4,874,969	706,664	1,637,734	263,763
5 mo. end. May, 1929	7,022,217	4,826,449	685,703	1,580,251	161,976
Boston Elevated Railway, Boston, Mass.					
April, 1930	2,813,083	1,934,394	139,186	757,504	54,281
April, 1929	2,916,473	1,946,699	147,017	837,141	140,667
May, 1930	2,824,945	1,949,483	135,225	882,986	45,824
May, 1929	2,978,446	1,990,084	147,965	992,630	148,719
Eastern Massachusetts Street Railway, Boston, Mass.					
April, 1930	651,636	418,236	28,046	216,229	47,051
April, 1929	716,162	427,669	32,766	280,222	100,085
4 mo. end. Apr., 1930	2,806,526	1,734,076	125,478	986,637	264,167
4 mo. end. Apr., 1929	3,031,473	1,805,468	137,665	1,160,612	387,889
May, 1930	663,941	422,804	29,137	222,305	53,076
May, 1929	720,540	460,195	31,258	246,558	80,660
5 mo. end. May, 1930	3,470,467	2,156,881	154,616	1,208,942	317,243
5 mo. end. May, 1929	3,752,014	2,265,663	168,923	1,407,170	468,550
Boston, Worcester & New York Street Ry., Framingham, Mass.					
3 mo. end. Mar., 1930	163,752	148,672	4,875	11,341	3,151
3 mo. end. Mar., 1929	160,945	153,471	4,875	3,184	*1,925*
Department of Street Railways, Detroit, Mich.					
April, 1930	1,994,861	1,662,884	65,090	281,656	138,595
April, 1929	2,342,050	1,911,641	62,504	376,592	250,140
12 mo. end. Apr., 1930	25,125,914	20,083,004	761,208	4,395,767	2,670,144
12 mo. end. Apr., 1929	25,845,185	20,461,626	763,748	4,826,434	3,050,218
May, 1930	1,974,359	1,543,263	65,090	390,505	243,875
May, 1929	2,355,752	1,894,548	62,504	407,659	272,651
12 mo. end. May, 1930	24,744,522	19,731,719	763,794	4,378,613	2,641,368
12 mo. end. May, 1929	26,133,685	20,751,617	759,288	4,815,578	3,065,729
Kansas City Public Service Co., Kansas City, Mo.					
April, 1930	715,707	560,356	41,675	113,675	39,101
April, 1929	752,188	.....	.....	.....	62,052
4 mo. end. Apr., 1930	2,903,432	2,254,213	166,700	482,318	182,759
4 mo. end. Apr., 1929	3,046,990	.....	.....	.....	286,723
May, 1930	719,705	552,389	41,675	125,640	45,132
5 mo. end. May, 1930	3,622,938	2,806,603	208,375	607,958	227,891
Illinois Terminal Co., St. Louis, Mo.					
April, 1930	590,334	399,704	24,000	166,553	131,438*e*
April, 1929	599,678	429,009	21,262	149,407	110,337*e*
4 mo. end. Apr., 1930	2,271,906	1,601,240	96,000	574,589	409,296*e*
4 mo. end. Apr., 1929	2,383,240	1,710,053	85,048	588,015	428,056*e*
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
April, 1930	71,000	61,116	4,800	10,298	*21,343*
April, 1929	82,255	61,939	7,840	13,981	*17,833*
4 mo. end. Apr., 1930	332,725	256,466	19,200	78,204	*46,260*
4 mo. end. Apr., 1929	345,804	250,936	31,360	72,455	*54,288*
Kingston Consolidated Railroad, Kingston, N. Y.					
3 mo. end. Mar., 1930	21,852	21,665	1,249	*225*	*14,242*
3 mo. end. Mar., 1929	24,077	22,398	1,364	1,170	*6,184*

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Brooklyn-Manhattan Transit System, New York, N. Y.					
May, 1920	5,229,829	3,250,525	350,512	1,696,873	929,201
May, 1929	4,298,360	2,649,404	290,064	1,427,548	686,447
11 mo. end. May, 1930	55,630,953	36,554,791	3,641,508	16,230,339	7,717,543
11 mo. end. May, 1929	44,418,548	28,515,519	3,091,001	13,726,948	5,914,850
Brooklyn & Queens Transit System, New York, N. Y.					
May, 1930	2,030,966	1,499,813	115,841	434,594	310,865
May, 1929	2,130,026	1,634,626	108,102	409,838	282,503
11 mo. end. May, 1930	21,620,942	16,908,036	1,263,702	3,683,981	2,306,064
11 mo. end. May, 1929	22,082,832	18,190,140	1,178,751	2,952,984	1,542,559
Hudson & Manhattan R.R., New York, N. Y.					
May, 1930	1,039,637	509,707*a*	.....	529,929	194,759
May, 1929	1,069,375	525,763*a*	.....	543,612	206,781
5 mo. end. May, 1930	5,262,626	2,606,139*a*	.....	2,656,487	982,850
5 mo. end. May, 1929	5,279,986	2,653,651*a*	.....	2,626,334	946,164
Interborough Rapid Transit Co., New York, N. Y.					
April, 1930	6,276,781	3,893,075	216,482	2,167,223	*161,201c*
April, 1929	6,151,493	3,545,832	203,597	2,402,064	607,614
10 mo. end. Apr., 1930	60,628,687	37,706,793	2,093,907	20,827,986	*1,791,551c*
10 mo. end. Apr., 1929	57,748,164	35,335,159	2,011,315	20,401,688	2,411,531
May, 1930	6,287,149	3,879,238	216,201	2,191,708	*144,798*
May, 1929	6,261,572	3,556,702	192,693	2,512,178	645,131
11 mo. end. May, 1930	66,915,835	41,586,031	2,310,109	23,019,694	*1,936,350*
11 mo. end. May, 1929	64,009,737	38,891,861	2,204,009	22,913,867	3,056,662
Long Island Railroad, New York, N. Y.					
April, 1930	3,123,136	2,247,085	202,560	673,273	523,097*e*
April, 1929	3,230,773	2,260,399	187,022	781,986	621,641*e*
4 mo. end. Apr., 1930	11,778,043	9,104,775	529,505	2,141,594	1,570,685*e*
4 mo. end. Apr., 1929	11,937,030	8,941,750	488,888	2,495,927	1,929,832*e*
New York, Westchester & Boston Railway, New York, N. Y.					
April, 1930	214,672	116,322	25,071	73,852	*158,947*
April, 1929	203,585	127,361	23,350	53,558	*160,516*
4 mo. end. Apr., 1930	824,224	463,478	98,918	264,659	*654,723*
4 mo. end. Apr., 1929	767,041	495,413	81,655	182,707	*660,234*
May, 1930	230,781	123,922	.....	81,510	*148,173*
May, 1929	223,109	121,624	.....	78,409	*137,370*
5 mo. end. May, 1930	1,055,005	587,400	.....	346,170	*802,897*
5 mo. end. May, 1929	990,151	627,037	.....	261,116	*797,605*
Staten Island Rapid Transit Co., New York, N. Y.					
April, 1930	198,184	152,662	17,000	28,492	34,026*e*
April, 1929	218,841	173,812	17,000	28,026	*9,035e*
4 mo. end. Apr., 1930	762,095	599,381	69,500	91,642	70,755*e*
4 mo. end. Apr., 1929	907,371	685,394	72,000	149,966	3,237*e*
Third Avenue Railway System, New York, N. Y.					
April, 1930	1,236,554	932,377	94,071	227,886	12,657
April, 1929	1,317,640	993,551	83,031	260,523	811
10 mo. end. Apr., 1930	12,553,690	9,670,687	894,454	2,180,946	*302,676*
10 mo. end. Apr., 1929	12,888,649	9,929,938	899,763	2,247,246	*313,670*
May, 1930	1,291,409	956,965	86,589	265,649	58,138
May, 1929	1,387,522	1,039,778	88,035	278,698	31,551
11 mo. end. May, 1930	13,845,300	10,627,653	981,043	2,446,596	*244,537*
11 mo. end. May, 1929	14,276,172	10,969,717	987,798	2,525,944	*281,618*
Philadelphia & Western Railway, Norristown, Pa.					
April, 1930	58,701	51,519*b*	.....	.....	7,182
April, 1929	68,301	53,813*b*	.....	.....	14,488
4 mo. end. Apr., 1930	233,640	208,121*b*	.....	.....	25,528
4 mo. end. Apr., 1929	259,795	213,618*b*	.....	.....	46,177
May, 1930	61,065	.....	.....	.....	8,504
May, 1929	69,139	.....	.....	.....	14,047
5 mo. end. May, 1930	294,713	.....	.....	.....	32,033
5 mo. end. May, 1929	328,933	.....	.....	.....	58,226
United Electric Railways, Providence, R. I.					
April, 1930	563,595	475,039	34,687	53,867	2,838
April, 1929	611,247	478,169	34,906	98,171	47,143
4 mo. end. Apr., 1930	2,339,923	1,971,707	138,833	229,382	24,089
4 mo. end. Apr., 1929	2,495,407	2,008,484	139,627	347,495	143,687
Galveston-Houston Electric Co., Houston, Texas					
April, 1930	41,348	24,809	2,608	13,929	.....
April, 1929	47,074	27,891	2,569	16,613	.....
12 mo. end. Apr., 1930	559,805	319,833	32,557	207,606	*61,938*
12 mo. end. Apr., 1929	622,577	340,155	31,684	240,741	*29,998*
Houston Electric Co., Houston, Texas					
April, 1930	261,403	165,549	22,485	73,369	.....
April, 1929	280,506	170,401	24,712	85,391	.....
12 mo. end. Apr., 1930	3,317,103	2,064,935	264,811	1,005,982	615,008
12 mo. end. Apr., 1929	3,378,329	2,088,813	287,696	1,001,818	594,874
Pacific Northwest Traction Co., Seattle, Wash.					
April, 1930	76,713	55,727	5,298	15,686	.....
April, 1929	69,201	56,981	4,944	7,274	.....
12 mo. end. Apr., 1930	991,308	718,416	55,317	227,572	112,694
12 mo. end. Apr., 1929	884,826	747,440	52,372	85,012	*46,098*
Edmonton Radial Railway, Edmonton, Alta.					
April, 1930	66,384	45,298	.....	21,086	*1,641*
April, 1929	72,172	45,226	.....	26,945	1,097
4 mo. end. Apr., 1930	304,775	191,710	.....	113,064	5,996
4 mo. end. Apr., 1929	306,222	180,369	.....	125,852	14,960
May, 1930	63,775	46,729	.....	17,046	*2,681*
May, 1929	65,923	44,079	.....	21,844	996
5 mo. end. May, 1930	368,550	238,439	.....	130,111	3,315
5 mo. end. May, 1929	372,146	224,449	.....	147,697	15,956

a Includes taxes. *b* Includes operating expenses, taxes and income deductions. *c* Amount by which full 5 per cent Manhattan dividend rental was not earned. *d* Residue receipts after taxes and city's share. *e* Net after rents.

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Cleveland, Ohio—Opening of through railroad service at Cleveland's new Union Terminals, a $200,000,000 development, was celebrated June 28.

✦

Seattle, Wash.—The Board of Public Works will call for bids for five trackwork layouts for the municipal railway department to cost about $60,000.

✦

East St. Louis, Ill.—Following a hearing on June 17, the Illinois Commerce Commission has under advisement the application of the East St. Louis Railway for a straight 10-cent car and bus fare. Under the new fare the company hopes to get $85,000 a year additional revenue. This would enable it to earn 4½ per cent on its valuation. The city opposed the application.

✦

Paterson, N. J.—The Public Service Commission has approved substitution of buses for trolleys on the run of Public Service Co-ordinated Transport between Paterson and Haledon.

✦

Detroit, Mich.—The proposal to build street cars in its own shops so that employees in the shops of the Municipal Railway may get more than four days' work a week has been rejected by the Detroit Street Railway Commission.

✦

Philadelphia, Pa.—The City Council committee on transportation has approved construction of a $29,000,000 extension of the Market Street subway from Twentieth Street to 46th Street. The measure calls for two tubes under the Schuylkill to replace elevated structure. The committee also has approved the construction of a high-speed line under Locust Street, from Eighth to Eighteenth Streets.

✦

St. Louis, Mo.—The recent survey of downtown traffic conditions made by the St. Louis Public Service Company has revealed widespread violations of the parking laws in the congested districts.

✦

Danbury, Conn. — The Danbury Power & Transportation Company has purchased the White Line Bus Corporation, Inc., Bridgeport, Conn., and has petitioned the Public Utilities Commission for permission to discontinue trolley service between Wentworth Street and Bethany Chapel. A hearing on a petition providing for service by bus over that part of North Main Street was set for June 30. A 10-cent fare is asked.

✦

New York, N. Y.—Bids were opened June 28 by the Board of Transportation for construction of the seventh section of the new city subway system in the Bronx. The low bidder, at $2,691,028, was Di Marco & Reimann.

Voters Approve New Chicago Unification Franchise

$200,000,000 Must Be Spent Within Ten Years and $65,000,000 Within Three Years. 1,700 New Cars and 300 Buses on Program

CITIZENS of Chicago, by a majority of approximately five to one, on July 1, voted for the transportation ordinance, planned to relieve the congestion in the downtown districts, provide rapid transit to far outlying points and furnish transportation to districts heretofore practically isolated.

The ordinance provides for a merger of the elevated and surface lines and various feeder buses. Construction of two subways, through which the surface and elevated lines will enter the downtown district, will go far toward relieving the present undesirable congestion.

Seventeen hundred new cars, elevated and surface, and 300 feeder buses are also included in the program.

The ordinance requires the transportation companies to expend $200,000,000 in extensions and improvements in the next ten years, $65,000,000 of which must be spent in the first three years after its adoption and acceptance. Financial experts who assisted the city aldermen and lawyers in the framing of the ordinance, have stated that in their opinion the necessary money can be raised, as the financial setup is on a sound basis.

Chicago has talked for a quarter of a century on the need for subways in the downtown district to provide additional trackage. The ordinance provides for such subways to be built and owned by the city and operated by the transportation companies. As one commentator put it:

"Rapid transit is the greatest need of Chicago as the city extends its boundaries. It is essential for the people to be able to travel from one section of the city to another in the least possible time, and this service can best be rendered by consolidation of the transportation companies and the co-ordination of elevated, surface and bus lines, as provided in the ordinance."

COMING MEETINGS

July 10 — New York Railroad Club Annual Outing, up the Hudson on the Day Line steamer *Alexander Hamilton.*

July 17-18 — Central Electric Railway Association, the Breakers, Cedar Point, Sandusky, Ohio.

July 23-25 — Electric Railway Association of Equipment Men, Southern Properties, Nashville, Tenn.

July 24-25 — Central Electric Railway Accountants' Association, Cedar Point, Ohio.

Aug. 13-14—Wisconsin Utilities Association, Milwaukee, Wis.

Sept. 17-19 — Canadian Electric Railway Association, 26th annual convention, Ottawa, Canada.

Oct. 29-30—Iowa Electric Railway Association, Des Moines, Iowa.

Renewal of Toledo Grant an Issue

Six charter amendments, among them two aimed to cure defects affecting the street railway franchise renewal, will be submitted at the August primary election. If the charter amendments are carried, renewal of the Milner ordinance under which the Community Traction Company has been operating in Toledo, Ohio, for nearly ten years, will be submitted to electors in November. A provision now in the charter bars renewal of the ordinance except within a year of expiration date. The Milner plan was so drawn that, in case the grant is not renewed, it continues to govern for fifteen years, during which time the property is to be amortized. Another amendment will enable voters to give an exclusive franchise by vote. The present charter bars any exclusive franchise. Under terms of supplementary legislation, the Community Traction Company, now virtually has a monopoly of railway and bus transportation in Toledo.

Accountants to Meet at Cedar Point

Beautiful Cedar Point, near Sandusky, Ohio, will be the scene of the sixty-third meeting of the Central Electric Railway Accountants Association July 24 and 25. "The Breakers" will be the hostelry, and the session on July 25 will be held on the steamer *Chippewa* with luncheon at Put-In-Bay. There will be a dance every night and such other frivolity as golf, boating and bathing, to say nothing of the chances for hilarity at the Amusement Park. L. G. Tighe, president of the Central Electric Railway Association, will deliver the opening address. "Calendar Simplification" will be explained by M. B. Folsom, assistant treasurer of the Eastman Kodak Company, and "Freight Accounting—Your Problem and Mine" will be discussed by C. H. Sellman, auditor freight accounts, New York, Chicago & St. Louis Railway. Write the "Breakers" now for reservations!

Digitized by Google

LATE NEWS

(*Continued from Page* 486)

Oakland, Cal.—At a meeting of the directors of the Key System Transit Company on June 19, William P. St. Sure was elected a director to succeed the late B. W. Fernald. A. E. Nicoletti, assistant claims agent, has been made claim agent, to succeed Mr. Fernald. Perry Woodcock has been appointed assistant claims agent.

✦

Hartford, Conn. — The Connecticut Company has been authorized by the Public Utilities Commission to substitute service by bus for railway service between Middletown and Hartford. The buses will operate from Gold and Main Streets, Hartford, to the State Hospital for the Insane, Middletown, over a route slightly different from that proposed in the commission's order of April 22.

✦

Kansas City, Mo.—The Kansas City Public Service Company has passed the dividend on the $7 preferred stock due at this time.

✦

Watertown, N. Y.—The Public Service Commission has granted the petition of the Black River Traction Company to abandon 6.33 miles of its 11.33 miles of route in Watertown and the villages of Glen Park, Brownville and Dexter. It is probable that the company would have operated its line outside of the city for some time were it not for the plans of the State Highway Department to construct a state highway that would require the company to move its poles and tracks and to pave between the tracks at a cost of $77,932, an expenditure the company felt unwarrented.

✦

Glendale, Cal.—Application has been made to the Railroad Commission by the Glendale & Montrose Railway for authority to abandon operation of freight and passenger service between Verdugo Road on the south end, La Crescenta on the north, Eagle Rock City on the east, and Brand Boulevard, Glendale, on the west, and to cancel its contract for operation with Los Angeles & Salt Lake Railroad. Competition has made it no longer possible to operate profitably.

✦

Salt Lake City, Utah—Armed with a consent granted by the City Commission, the Utah Light & Traction Company has asked the Public Utilities Commission for a permit to install trackless trolley service on its Warm Springs line. Street cars will be operated as required to the present terminus of the Centerville line, and railway service will be continued to Warm Springs by way of the Center Street line.

✦

Tucson, Ariz.—Preparatory to asking a new franchise from the city, the Tucson Rapid Transit Company has filed for record an amendment to its articles of incorporation extending its corporate life for another 25 years. The company now operates railway lines to the university and through the southern part of the city in addition to bus service started in 1925 under a separate fifteen-year franchise from the city.

✦

Niagara Falls, N. Y.—Justice Ackerman in the Supreme Court at Buffalo has dismissed the application of Niagara Falls taxpayers for an injunction restraining the Public Service Commission from proceeding to fix fares on local lines of the International Railway, Niagara Falls, in connection with the recent contract between the city and the company providing for an 8-cent fare. Justice Ackerman ruled that the judicial district at Buffalo has no jurisdiction in the case. The commission now has the application of the railway for a higher fare here under consideration.

✦

Los Angeles, Cal.—The Pacific Electric Railway has applied to the Railroad Commission for permission to discontinue passenger service on its line between Santa Ana and Orange, stating that service by applicant and Motor Transit Company imposes unnecessary expense, especially as Pacific Electric Railway operations are conducted at a loss.

✦

Binghamton, N. Y.—The Public Service Commission on June 26 authorized the Triple Cities Traction Company to substitute buses for street cars on its Clinton Street lines in Binghamton and Dickinson. Buses to be installed, each carrying 25 passengers, will operate on the same schedule as the street cars. Approximately 3 miles of track will be removed under the substitution plan.

✦

Louisville, Ky.—As a result of sale of all power and substation operations by the Louisville Railway to the Louisville Gas & Electric Company, and entry of a 20-year contract whereby the railway will buy its power, 140 employees of Louisville Railway on July 1 automatically became employees of the Louisville Gas & Electric Company. A farewell dinner to all company power department workers was arranged by the railway on June 28, one group being dined at noon and the other in the evening. James P. Barnes, president of the company; Frank H. Miller, vice-president and general manager; Neil W. Funk, safety director, and Alfred Selligman, attorney, were among the speakers.

✦

Trenton, N. J.—The Public Utility Commission on June 28 ordered suspension for three months from July 15 of a proposed schedule of fares asked by the Public Service Co-ordinated Transport. The company, which is now charging a 10-cent cash fare and selling ten tokens for 50 cents, good on buses or trolleys, seeks to reduce the number of tokens to four for 25 cents. The board announces that time is desired to inquire into the reasonableness of such a rate.

✦

New York, N. Y.—The Transit Commission has postponed until Sept. 4 a hearing on the proposed removal of the Sixth Avenue Elevated line. The delay was granted at the request of Arthur Peacock, of counsel for the Interborough Rapid Transit Company, operator of the line and opponent of the removal.

✦

New York, N. Y.—The Union Motor Coach Terminal, successor to the Waldorf-Astoria terminal and managed by Fifth Avenue Coach Company, has been opened at 59-61 West 36th Street. Motor coach operating companies using the terminal are Gray Line Motor Tours, Inc., Fifth Avenue Coach subsidiary; the Greyhound Lines, the P. R. T. Lines, New England Transportation Company, and Champlain Coach Lines.

✦

Seattle, Wash.—Trackless trolleys will undoubtedly be tried in connection with the Municipal Railway. George B. Avery, utilities superintendent, is conducting an investigation and his final verdict is expected soon. An early proponent of trackless trolleys here was Roy E. Furse, railway superintendent. Councilmen Case and Laube have inspected the trackless trolley system in Salt Lake City and J. W. A. Bollong, city traffic engineer, has studied trackless trolley operation in Eastern cities, particularly the new installation in Detroit.

✦

Philadelphia, Pa.—On June 24 Deputy City Comptroller Wilson, Director Myers, of the Department of City Transit; Councilman Pommer, chairman of City Council's transportation committee, and W. K. Myers, vice-president of Mitten Management, were appointed a committee to consider and report on the method to be followed in arriving at a financial settlement for proposed municipal purchase of the Philadelphia Rapid Transit Company and its underlying systems.

✦

Erie, Pa. — The Erie Railways has asked the Public Service Commission for permission to abandon railway service in West 26th Street and the West Ridge Road. Through its bus operating subsidiary, the Erie Coach Company, the railway plans to operate buses over the route, between Perry Square and the village of Westminster, Pa.

✦

Detroit, Mich.—The Street Railway Commission has authorized Del A. Smith, general manager, to look further into a proposal through which the Frischkorn Realty Company offers to extend trackless trolley overhead construction in Plymouth Road 2 miles west of River Rouge Park, the present terminus. In return for service in the district, the company stands ready to finance the entire cost of the overhead equipment, estimated at $26,000.

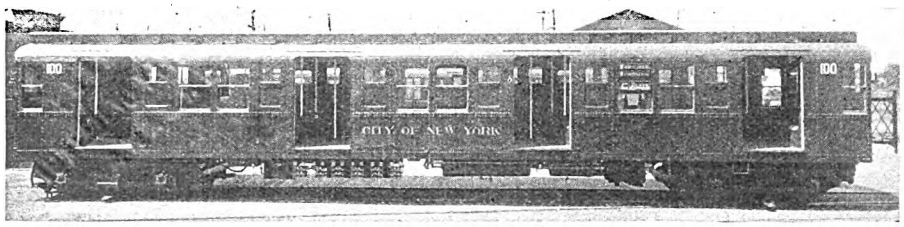
✦

Toronto, Ont.—The City Council on June 15 chose the Transportation Commission, responsible for the operation of the local municipal railway and bus lines. It is to be composed of Fred Hubbard, formerly assistant general manager of the Toronto Railway; W. C. McBrien, a member of the Board of Harbor Commissioners; S. J. McMaster, whose name was rejected by Council on several occasions.

✦

Pontiac, Mich.—An ordinance to increase car fare in Pontiac from 7 to 8 cents has been passed by the local City Commission. The bus fare remains unchanged. The new fare schedule also calls for an increase in the price of tickets, from four for 25 cents and 17 for $1, to four for 30 cents and 15 for $1. A charge of 1 cent for transfers from street cars to buses also is allowed. No charge will be made for transfers from buses to street cars. The Eastern Michigan Railways operates here under a day-to-day agreement.

Digitized by Google

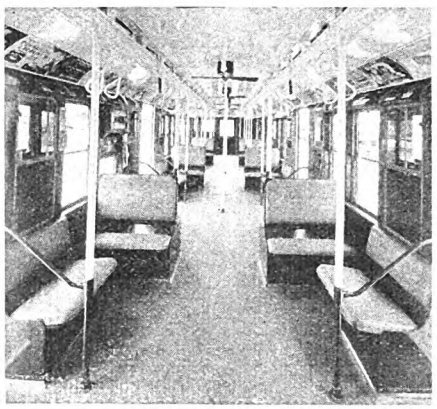


The four-door arrangement of New York's new subway cars is expected to expedite loading

New York Subway Cars Approach Completion

The first consignment of the 300 steel cars for use on the new subway lines of New York City will be delivered during the last week in July. The cars will be equipped with motors and other electrical apparatus at the city's new shops at 207th Street and the Harlem River. This work will cost $2,500,000, bringing the total cost of car construction and equipment up to $11,376,397, or about $38,000 for each of the 300 cars. The cars will be completed and equipped in ample time for thorough testing before they are placed in operation on the new Eighth Avenue line next year.

Four pairs of doors on each side of the car permit rapid ingress and egress in eight files, and it is believed that the time required for loading and unloading passengers can be cut 33⅓ per cent below the minimum on cars now in use here. The new cars will have no vestibules and special door-closing devices are expected not only to expedite loading and unloading but also to cut down the number of injuries to passengers. These devices make it impossible for passengers to hold up progress of a train by pushing the doors back as is now often done on Interborough cars.



Interior arrangement of subway cars provides ample standing capacity

Each of the cars will seat 60 persons and provide standing room for 220, giving a gross capacity of 280 persons for a 60-ft. car. The cars are 10 ft. wide and are expected to have 40 per cent more passenger capacity than the Interborough standard car.

Each car will have 22 electric lamps, each separately wired and not affected by mishap to any of the others. The cars will weigh 42 tons apiece, and each will contain 18,935 rivets, as well as nearly 2 miles of wiring.

Segregation of Akron Properties

In connection with the consolidation of companies in the Commonwealth & Southern group in Ohio, the Northern Ohio Power & Light Company has petitioned the Ohio Public Utilities Commission for permission to segregate its light and power business from its transportation business. This applies to its interurban as well as city lines.

Three companies, the Akron Transportation Company, the Northern Ohio Interurban Company and the Canton Traction Company, have been organized, or are in the process of organization, to take over the transportation business. All tracks, overhead distribution system, cars, buses and other transportation equipment used in furnishing railway and bus service in Akron will be conveyed to Akron Transportation Company subject to the present mortgage liens until paid or retired.

The same plan is to be carried out with reference to the interurban lines of the company and the Canton city system. In each instance Ohio Edison Company will hold the stock.

On July 1 the stockholders approved the consolidation of its power and light properties with those of the Pennsylvania-Ohio Power & Light Company, the Ohio Edison Company, the Akron Steam Heating Company, and the London Light & Power Company.

Unemployment Hurts Toledo Earnings

Operation of the Community Traction Company, Toledo, during the first five months of 1930 resulted in a net deficit of $72,890 as compared with the favorable balance of $95,284 for the similar period last year, after all charges under the Milner ordinance. Service cuts have been held to the minimum so that most of the economies have been from other sources. The drop in revenue from $1,766,995 for the first five months of 1929 to $1,435,751 for the similar period this year has been too much to absorb. Industrial unemployment has been largely responsible for the changed showing. The operating ratio this year is 78.518 per cent as against 71.323 per cent for similar period last year. Bus ratio is 83.048 per cent and railway ratio 76.741 per cent for the current year.

Conspectus of Indexes for June, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years	
				High	Low
Street Railway Fares* 1913 = 4.84	June, 1930 **7.97**	May, 1930 **7.96**	June, 1929 **7.76**	June, 1930 **7.97**	June, 1925 **7.27**
Electric Railway Materials* 1913 = 100	June, 1930 **138.9**	May, 1930 **139.9**	June, 1929 **145.8**	Dec., 1926 **159.2**	June, 1930 **138.9**
Electric Railway Wages* 1913 = 100	June, 1930 **231.7**	May, 1930 **231.7**	June, 1929 **230.8**	April, 1930 **231.7**	June, 1925 **222.4**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	June, 1930 **199.5**	May, 1930 **201.1**	June, 1929 **199.7**	Nov., 1928 **205.7**	July, 1929 **199.0**
General Construction Cost Eng'g News-Record 1913 = 100	June, 1930 **203.4**	May, 1930 **205.9**	June, 1929 **205.6**	Jan., 1927 **211.5**	Nov., 1927 **202.0**
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	May, 1930 **89.1**	April, 1930 **90.7**	May, 1929 **95.8**	Nov., 1925 **104.5**	May, 1930 **89.1**
Wholesale Commodities Bradstreet 1913 = 9.21	June, 1930 **10.77**	May, 1930 **10.94**	June, 1929 **12.46**	Dec., 1925 **14.41**	June, 1930 **10.77**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	May, 1930 **150.1**	April, 1930 **151.2**	May, 1929 **153.3**	Nov.,1925 **167.1**	Mar., 1930 **150.1**
Cost of Living Nat. Ind. Conf. Bd. 1914 = 100	May, 1930 **156.2**	April, 1930 **157.5**	May, 1929 **159.4**	Nov., 1925 **171.8**	May, 1930 **156.2**
Industrial Activity Elec. World, kw.-hr. used 1923-25 = 100	May, 1930 **119.0**	April, 1930 **120.2**	May, 1929 **136.9**	Feb., 1929 **140.4**	Aug., 1925 **94.3**
Bank Clearings Outside N. Y. City 1926 = 100	May, 1930 **92.1**	April, 1930 **93.4**	May, 1929 **102.5**	Oct., 1929 **111.8**	May, 1930 **92.1**
Business Failures Number	May, 1930 2083	April, 1930 1976	May, 1929 1724	July, 1929 1581	Sept., 1928 1348
Liabilities, Millions of Dollars	**57.72**	**80.71**	**44.58**	**102.09**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Digitized by Google

PERSONAL MENTION

C. F. Hirshfeld to Conduct Car Research for Industry

Detroit Edison official Selected as Engineer-Expert for Important Task by Presidents' Conference Committee of A.E.R.A.

APPOINTMENT of C. F. Hirshfeld as chief engineer of the Presidents' Conference Committee, intrusted with the work of expediting the development of the urban railway car, was announced at the meeting of the American Electric Railway Association at San Francisco. It is a most important post, but Mr. Hirshfeld has had a wealth of experience in conducting research projects.

After a thorough canvass of the problem, the committee unanimously decided that a knowledge of car building or the operation of railway properties was not a prerequisite to the position and might constitute a handicap. Rather the man needed, it was decided, was one with wide experience in handling research projects, an engineer-executive, and Mr. Hirshfeld was selected as the man who had demonstrated his ability to conduct large research problems and bring them to a successful conclusion.

As the address of Dr. Thomas Conway, Jr., abstracted elsewhere in this issue, makes plain, Mr. Hirshfeld is relying upon the active co-operation of railway master mechanics, of engineers and technicians of the car builders, of the makers of electric equipment and of braking apparatus and of other groups whose products enter into railway cars. The industry, through the association and especially through the Presidents' Conference, bespeaks full co-operation for Mr. Hirshfeld that worthwhile experiments with any new products may be so carried out as fully to determine their practical usefulness.

Mr. Hirshfeld has been chairman of the technical national section of the National Electric Light Association. He is chief of the research department of the Detroit Edison Company, with which his work has been of a varied character. In addition, Mr. Hirshfeld has conducted a general consulting engineering business. A native of San Francisco, he attended the University of California, from which he was graduated in 1902 with a B.S. in electrical engineering, three years later receiving the M.M.E. degree from Cornell University. From 1903 to 1914 he was a member of the engineering faculty of Cornell, starting as instructor in experimental engineering and ending as full professor of heat-power engineering, machine design, gas-power engineering, etc.

Mr. Hirshfeld has been extremely active in association work, having served as a member of various committees of the American Society of Mechanical Engineers and of the American Institute of Electrical Engineers, as past-chairman of the steam turbine and generator committee of the Association of Edison Illuminating Companies, and as past-chairman of the prime movers committee of the National Electric Light Association. He is the author or co-author of five books on engineering subjects.

Mr. Hirshfeld joined the Detroit Edison Company in 1913 and built up in that company the research department, of which he is chief. His work with the company has been of an extremely varied character, as problems come to the research department from practically all of the other departments of the company. He is particularly well known in the electrical field through his study on industrial electric heating, work started in 1914 and continued with interruptions ever since. He has also been active in rate controversies and in the rehabilitation and management of power plants.

Mr. Hirshfeld served during the World War as major and lieutenant colonel in the Ordnance Department of the United States Army.

C. F. Hirshfeld

Three Commercial Vice-Presidents for Westinghouse

Three new executive positions, the office of commercial vice-president, have been created by the board of directors of the Westinghouse Electric & Manufacturing Company.

C. E. Stephens has been selected to occupy the new position for the Atlantic division, with headquarters at New York City; N. G. Symonds for the central division in Chicago, and W. R. Marshall for the Pacific division at San Francisco.

All of the new commercial vice-presidents have been district managers and will continue the duties of that position, in addition to those of the new position.

W. R. Bell at Baton Rouge, H. C. Leonard in El Paso

W. R. Bell, since 1926 general superintendent of the El Paso Electric Company, El Paso, Tex., has been made general superintendent of the Baton Rouge Electric Company and the Louisiana Steam Products Company, Baton Rouge, La.

Mr. Bell will be succeeded in El Paso by H. C. Leonard, who has been in charge of the electrical department of the Virginia Electric & Power Company, Richmond, Va.

Mr. Bell has been employed by companies operating under the executive management of Stone & Webster, Inc., since 1906. He began in the accounting department of the Paducah Electric Company, working during vacations while attending college. Following his graduation from Rose Polytechnic Institute, Terre Haute, Ind., as electrical engineer, Mr. Bell accepted the position of assistant superintendent of the Baton Rouge Electric Company, later being made sales manager. Still later he was sent to Haverhill, Mass., as sales manager of the Haverhill Gas Light Company. In August, 1924, Mr. Bell was sent to El Paso as sales manager. He made a splendid record as head of the sales department and during his two years as sales manager in El Paso, the volume of appliance sales trebled, the sales floor space was doubled and the sales force was greatly enlarged.

Since becoming general superintendent in 1926, Mr. Bell has been closely identified with some of the most important developments ever undertaken by the company.

Mr. Leonard became associated with the Stone & Webster organization in 1919. He was a member of the group of engineers making an appraisal of the property of the Virginia Electric & Power Company. Upon completion of this work, Mr. Leonard was sent to the Boston office as designer. He remained in Boston only a short time until he was again sent to the Virginia Electric & Power Company, this time entering the engineering department.

Some time after his return to Virginia, Mr. Leonard was made electrical engineer in charge of design of the power station, substations and transmission lines. In 1927 he assumed charge of the electrical department of the company at Norfolk. He remained in Norfolk until early in 1930, when he was promoted and sent to Richmond, in charge of the electrical department of the company there.

Mr. Leonard is a native of Worcester, Mass. He was graduated from Worcester Polytechnic Institute with the degree of B.S. in electrical engineering. Following graduation, he entered the testing and engineering department of the General Electric Company, but he continued his studies at Union College, where he received a degree of M.S.

T. E. Thomas, traffic manager of the London County Council Tramways, London, England, has been appointed general manager to succeed J. K. Bruce, who is retiring on account of ill health. The salary is £2,000 a year, rising after four years by annual increments of £250 to £3,000. Mr. Thomas was formerly commercial superintendent of the Metropolitan District Railway and allied companies. He entered the County Council's service in 1917. He has recently been acting as general manager owing to Mr. Bruce's absence.

Digitized by Google

M. H. Frank Heads Wisconsin Association

New officers have been elected by the Wisconsin Utilities Association to serve from May 1 as follows:

President—M. H. Frank, assistant to the vice-president, Wisconsin Power & Light Company, Madison.
Vice-president—A. J. Goedjen, division manager, Wisconsin Public Service Corporation, Green Bay.
Treasurer—Ewald Haase, vice-president, Milwaukee Gas Light Company, Milwaukee.
Chairman Employees' Education Section—E. J. Steinberg, The Milwaukee Electric Railway & Light Company, Milwaukee.
Vice-chairman Employees' Education Section—R. G. Walter, Wisconsin Power & Light Company, Madison.

Other section officers are elected at separate conventions held during the year.

Mr. Frank has been manager of the Wisconsin Power & Light Company's Fond du Lac properties since 1918. After obtaining his electrical engineer's degree in 1915 he joined the Indiana & Michigan Electric Company, South Bend, Ind., as assistant construction engineer, where he built the 300-ft. Tainter gate dam and a 4,000-hp. hydro plant.

Mr. Frank remained there until 1916 as assistant engineer having charge of the operation of four hydro electric units, one steam plant and 75 miles of transmission lines. In that year, he became associated with the Galesburg Railway Lighting & Power Company, Galesburg, Ill., as operating engineer, where he laid out a 4,000-hp. steam plant and was in charge of the generation of both electricity and gas. After two years there, Mr. Frank went to Fond du Lac as manager for the former Eastern Wisconsin Electric Company, changed later to the Wisconsin Power & Light Company.

✦

"Bob" Harper Promoted by Virginia Electric Power

H. Holmes Harper has recently been transferred from the printing and stationery bureau of the Virginia Electric & Power Company at Richmond to the vice-president's office in Norfolk, where he is now assistant to Vice-President R. J. Throckmorton and associate editor of *The Vepcovian*. He replaces A. E. Dunn, who has been transferred to the distribution department at Norfolk.

"Bob" Harper was born near Burkeville, Va., on Nov. 4, 1906. He was graduated from Virginia Polytechnic Institute in June, 1927, with a degree of B.S. in electrical engineering. Mr. Harper joined the Vepco organization as a student engineer and was assigned to the production department at Richmond. He was later transferred to the treasurer's office, where he viewed the various operations of the company from a statistical standpoint, and in June, 1929, he became assistant supervisor in the printing and stationery bureau.

✦

M. M. Lloyd Retires from South Shore

M. M. Lloyd, for more than eleven years superintendent of shops and equipment for the Chicago, South Shore & South Bend Railroad, South Bend, Ind., and its predecessor companies, has retired from active service. His duties have been taken over temporarily by W. J. Freeman.

Mr. Lloyd was born in Rockford, Mich., on April 7, 1868. He went to the South Bend property in 1919 from Saginaw, Mich., where he had been master mechanic of the northwest division of the Michigan Railways. Previously he had worked as master mechanic for the Des Moines City Railway and the Interurban Railway, Des Moines, and the East St. Louis and Alton & Granite City lines in southern Illinois.

His first work was as locomotive engineer and motorman in Wichita, Kan., and then in St. Louis and in Granite City, Ill., as division foreman for the Sprague Electric Company and electrician with the American Steel Foundries.

✦

T. M. van der Stempel Joins General Car & Coach Company

Th. M. van der Stempel, who has been with the McGraw-Hill Publishing Company, Inc., since Jan. 1, 1929, and since April 1 of that year a member of the editorial staff of ELECTRIC RAILWAY JOURNAL, has recently resigned to accept a position with the newly organized General Car & Coach Corporation in Utica, N. Y., in charge of sales.

T. M. van der Stempel

Mr. van der Stempel has spent nearly all his time since his graduation as a mechanical and electrical engineer in 1920 in the transportation engineering field in various capacities. From August, 1924, to June, 1927, he was connected with the Chicago Motor Coach Company. There he learned the intricacies of city bus service from the ground up, starting as conductor and driver and advancing to the position of engineer in the traffic department, a post he relinguished to survey transportation facilities abroad, notably in Central America, South America and in Europe. Thus during 1927 and 1928 he studied the transportation facilities in 23 different countries.

During his work as a member of the editorial staff of ELECTRIC RAILWAY JOURNAL in charge of the new equipment, maintenance and foreign departments, he traveled widely throughout this country and increased his acquaintanceship among operators in both the electric railway and bus fields. His actual operating experience, his extensive study of railway and bus operating practices here and abroad and his work as a journalist all serve to qualify him to fill acceptably his new post in promotional work.

J. K. Bruce Resigns as London Tramway Manager

J. K. Bruce, the general manager of the London County Council's tramways, has tendered his resignation on the ground of ill health. The Council expressed deep regret. Since he became manager in 1924, the tramway undertaking instead of working at a loss as before is now making substantial profits. The change is attributed largely to the policy of Mr. Bruce in meeting competition by providing luxurious seats for tramcar passengers, raising the speed of the cars, improving the lighting, and generally making the service more attractive to the public. Mr. Bruce on retirement on June 30 became entitled to a pension of £805 and a lump sum of £2,426. In view of his great services a special grant of £2,000 is also proposed.

Mr. Bruce entered the service of the Council as a veterinary surgeon in the old horse car days of 1898. He served in turn as deputy chief officer and acting manager before he reached his present position in 1924. Statistics issued by the County Council show how under Mr. Bruce's management deficits on the working of the undertaking were changed into surpluses. Preliminary figures for the financial year ended March 31 show that after paying all expenses and debt charges (sinking fund and interest) there is a net surplus of £52,570. For the financial year now opening the estimate is that there will be a net surplus of £89,000. To recall the magnitude of the London municipal tramway undertaking, it may be mentioned that for the past financial year the receipts amounted to £4,413,450, and the working expenses including renewals to £3,638,505.

✦

Oren Root Resigns from Hudson & Manhattan

Oren Root, for almost eleven years president of the Hudson & Manhattan Railroad, operating under the Hudson River from New York to Newark and to Hoboken, has resigned, effective Sept. 1. The directors have not yet elected a successor.

Mr. Root resigned for personal reasons only. He is only 56 years old, and after a period of rest may re-enter business, but has no definite plans at present.

When Mr. Root took his post, the Hudson & Manhattan first lien and refunding mortgage 5s, Series A, were quoted at 57, and the adjusted mortgage income 5s were 16, while the preferred and common stocks were seldom traded in. An initial semi-annual preferred dividend of 2½ per cent was paid Aug. 15, 1923, and has been maintained to date, while an initial semi-annual common dividend was paid June 1, 1925, at the annual rate of 2½ per cent. The rate was advanced recently to $3.50 annually. The first lien 5s now sell at 99½, the adjusted mortgage 5s at 83⅜, the preferred stock at 81 and the common at 48⅜.

Mr. Root entered electric railway work in 1895 with the Metropolitan Street Railway of New York. He was schooled later in all departments of the company, working as a motorman, conductor, inspector and in other capacities. In 1903, he was appointed general manager of the Metropolitan and on Sept. 20, 1919, was elected president of the Hudson & Manhattan Railroad. He is a nephew of Elihu Root.

Digitized by Google

Many Changes on New Haven Bus and Suburban Lines

P. W. J. Smith has been made president of the New England Transportation Company, motor coach subsidiary of the New Haven, succeeding A. P. Russell, executive vice-president of the railroad. Mr. Smith, has been general superintendent of the New York, Westchester & Boston Railway and in charge of the motor coach lines of the County Transportation Company for several years. He retired from the New York, Westchester & Boston July 1. He has been connected with the New Haven or its allied lines for 42 years. He will establish headquarters for the New England Transportation Company in Providence, R. I. and will also become president of the County Transportation Company and the Sound View Transportation Company, subsidiaries of the New York, Westchester & Boston.

Leverett S. Miller has been president of the New York, Westchester & Boston Railway since May, 1909, and president of the County Transportation Company since April, 1927. He retired at his own request on July 1, after long and faithful service. For many years, prior to his connection with the New York, Westchester & Boston, he was general manager of the Central New England Railway. The office of president of the New York, Westchester & Boston will be assumed by J. J. Pelley, president of the New Haven.

W. H. Foster, general superintendent, and A. G. Baily, superintendent of the New York division of the New Haven, will act in those capacities with the New York, Westchester & Boston, which are now operated as an integral part of the New Haven rail system.

✦

K. F. Sapp in New Post in Atlanta

Kenneth Finch Sapp, recently appointed assistant to the manager, public relations department, Georgia Power Company, Atlanta, Ga., was born at Ottawa, Ill., on Oct. 11, 1901. He prepared in the elementary and high schools of Ottawa and attended the University of Illinois. Since leaving college, he served as sporting editor of the *Daily Republican-Times*, Ottawa, Ill., and as reporter on the *News-Herald*, Joliet, Ill., and the *Atlanta Constitution*, Atlanta, Ga. He resigned from the *Constitution* in 1925 to become a member of the staff of the public relations department, Georgia Power Company, being appointed editor of publications in November, 1926, and assistant to the manager in May, 1930.

✦

E. C. Rust Eastern Massachusetts Director and Trustee

At a recent meeting of directors of the Eastern Massachusetts Street Railway, Charles W. Hubbard, Jr., resigned and Edgar C. Rust was elected a director in his place. Mr. Rust was also elected a trustee of the road, under the provision of the public control act which permits the road's directors to elect one of the three trustees from among themselves. He fills the vacancy created by the resignation of Lester Watson.

Although he has resigned as a trustee, Mr. Watson will continue to serve as a member and chairman of the board of directors. He is retiring from the board of trustees simply because the duties of membership leave him insufficient time to devote to other necessary affairs. Mr. Watson's firm, Hayden, Stone & Company, still retains the very substantial interest in the road.

Edgar C. Rust, the new trustee and director, is well known in the financial community due to his years of association with E. H. Rollins, from the presidency of which concern he retired last year.

✦

R. M. Heinrichs, Bendix-Westinghouse Manager

R. M. Heinrichs has been appointed general manager of the newly formed Bendix-Westinghouse Automotive Air Brake Company. Mr. Heinrichs comes to the new brake company with a broad experience in the automotive field, having formerly served the Bendix Corporation as assistant to the vice-president in charge of sales. His connection with the Bendix Corporation covers a period of five years, previous to which time he had been identified with the Goodman Manufacturing Company, Chicago. He is a graduate of the engineering school at the University of Illinois.

R. M. Heinrichs

As general manager of the new company, Mr. Heinrichs will have at his disposal the engineering and service departments of both Bendix and Westinghouse effectively to serve the automotive industry. Manufacture of the automotive air brake will continue in the plants of the Westinghouse Air Brake Company at Wilmerding.

✦

Irving M. Tuteur, vice-president of McJunkin Advertising Company, Chicago, was elected president of the Public Utilities Advertising Association for the year 1930-31 at the association's annual convention held recently in conjunction with the annual meeting of the Advertising Federation of America. The new president has served the association for five years as chairman and one year as vice-chairman of its "Better Copy" committee, which has been devoted to the improvement of public utility advertising throughout the country. Under the direction of this committee, four "Better Copy" portfolios of outstanding public utility advertising have been published in the last six years. The committee has also conducted two nationwide "Better Copy" contests among utility companies.

F. L. Butler Heads Commonwealth Transportation Department

Further recognition of his outstanding ability among electric railway operators of the nation was accorded Frank L. Butler, vice-president in charge of railways for the Georgia Power Company, Atlanta, Ga., in his appointment, announced recently, as head of the transportation department of the Commonwealth & Southern Corporation, supervising company for the Georgia Power Company and its associated companies.

In his new position, Mr. Butler will be on call to give advice and assistance to all companies in the Commonwealth & Southern organization on transportation problems, but will remain in Atlanta as active head of the Georgia Power Company's railways. For many years Mr. Butler has been recognized as one of the leading electric railway authorities in America and has been high in the councils of the American Electric Railway Association. He has headed many important committees for that association and has had a leading rôle in shaping its policies. He is at present a member of its executive committee.

✦

J. M. Pogue Elected Vice-President of Interurban

J. M. Pogue, who has been director of purchases and claims of the Cincinnati & Lake Erie Railway at Springfield, Ohio, since its organization early this year, has been elected a vice-president of the concern.

Mr. Pogue will continue to make his headquarters in the interurban building in Springfield, where he has been located for a number of years. He entered the employ of the railway system in 1907, and has served in various capacities under several managements. He acted as general manager for the receiver of the old Indiana, Columbus & Eastern system prior to its absorption by the present company.

The Cincinnati & Lake Erie Railway now is operated under the general supervision of five vice-presidents, one located in Cincinnati, one in Philadelphia, two in Dayton, and Mr. Pogue in Springfield. Its lines extend from Cincinnati to Lake Erie cities and as far east as Columbus.

✦

W. S. Howland Now Edits "Snap Shots"

William S. Howland, editor of *Snap Shots*, Georgia Power Company, Atlanta, was born in New York, on June 18, 1901. He was educated at Phillips Exeter Academy, Exeter, N. H., and Princeton University, being graduated in 1923 from Princeton with a degree of A.B. Since leaving college, he has served as reporter on the *Atlanta Journal* and as a reporter and city editor of the *Tennessean*, Nashville, Tenn. He resigned as city editor of the *Tennessean* in April, 1929, to join the staff of the public relations department, Georgia Power Company, being appointed editor of *Snap Shots* in January of this year. In addition to serving as city editor of the *Tennessean*, he was editor of the *American*, a house organ published by the American Banks, Nashville, Tenn., and was instructor in journalism at George Peabody College for Teachers, Nashville, Tenn., for the summer session of 1928.

Digitized by Google

H. S. Newton Retires from Utility Work

Henry S. Newton, manager of the Parkersburg-Marietta division of the Monongahela-West Penn Public Service Company for seven years and for the past five years manager of the industrial development department of the West Penn, has retired from utility work. He will take up permanent residence on the eastern shore of Chesapeake Bay, near Easton, Md.

Mr. Newton has been engaged in utility work for more than a quarter of a century. He was graduated from the Ohio State College in electrical engineering with the degree of bachelor of science. His first work was with the General Electric Company, for which he served last as superintendent of one of its plants. After leaving that company he worked in a managerial capacity for various utilities, including the Hartford & Springfield Railway, connecting Hartford, Conn., and Springfield, Mass.; the Syracuse Rapid Transit Company; the Ohio Valley Electric Railway at Huntington, and several railways in Minnesota.

He went with the Monongahela system as manager of its electric railway and power properties at Parkersburg and Marietta and remained in that position for seven years before going to Fairmont, W. Va., as manager of the industrial development department.

OBITUARY

Richard Meriwether

Richard Meriwether, vice-president and general manager of the Dallas Railway & Terminal Company and the Texas Interurban Railway, Dallas, Tex., died on May 26 on a Missouri-Kansas-Texas train at St. Louis, Mo. Mr. Meriwether had left

Richard Meriwether

Dallas for New York on a short business trip. When the train pulled into the St. Louis Union Station a porter attempted to wake Mr. Meriwether, but failing to get any response summoned aid. The doctor who responded said Mr. Meriwether had died from natural causes.

Mr. Meriwether directed one of the few systems of its kind in the country that had maintained steady earnings and a sound financial basis in the face of decreases in the business over the country. He began his management of the company in 1917 and has served continuously.

Born at Frankfort, Ky., Oct. 13, 1875, Mr. Meriwether attended grade and high schools at Louisville, Ky. He entered the Rose Polytechnic Institute, Terre Haute, Ind., where he was graduated with electrical engineering as major subject.

His career began with the Southern Railroad. He then became connected with Siemens-Halske Electric Company of Chicago and the Western Electric Company of Chicago. In 1903 he went with the Louisville Railway as assistant to the superintendent of power, in charge of transmission lines.

Three years later he became associated with the Louisville & Eastern Railroad, an interurban line running from Louisville to Beard Station, Ky. He began as mechanical superintendent and was made general superintendent in charge of operation and construction in 1908.

He accepted a position with Stone & Webster in 1911 and went to Dallas as general superintendent of the Dallas Consolidated Electric Street Railway, the Rapid Transit Railway and the Metropolitan Street Railway. These companies were consolidated in 1917 and Mr. Meriwether became general manager. He was made vice-president and general manager in the spring of 1918.

As managing head of the Texas Interurban Railway, Mr. Meriwether was responsible for the building and operation of interurban lines to Terrell and Denton.

Mr. Meriwether also was active in civic and social affairs of Dallas. He was a director of the Republic National Bank & Trust Company, the Continental & Loan Association and the Better Homes Bureau. He was past-president of the Dallas Rotary Club and the Dallas Athletic Club. He also was a member of the City Club and Brook Hollow Golf Club.

More than 200 employees of the company and other electric railway lines gathered with other friends at the funeral and drove in a mile-long procession to Grove Hill Cemetery, where the remains were interred with Masonic rites.

✦

G. R. Millican

George Raymond Millican, 43 years old, vice-president and general manager of the Evansville & Ohio Valley Railway, died recently at his home in Evansville, Ind.

Besides being vice-president and general manager of the railway, Mr. Millican was president of the board of deacons of the First Presbyterian Church, a member of the Rotary club, a member of the Evansville Country Club, and a member of the Purdue University chapter of the Phi Delta Theta fraternity.

Starting out with the Evansville & Ohio Valley Railway on a surveying gang during vacations from school he remained with that company until death, becoming its vice-president and general manager when barely past 30 years of ago.

He attended Purdue University and in 1907 entered the employ of the railway. In 1910 he was transferred to Owensboro, Ky., as general manager of the Owensboro City Railroad, a subsidiary.

Mr. Millican was born in Evansville on Sept. 19, 1886.

S. R. Artman

Samuel R. Artman, long active in Indiana public affairs and best known for his rulings as a member of the Indiana Public Service Commission, died recently of injuries sustained in a fall from the roof of his home in Lebanon, Ind. Mr. Artman was graduated from the Indiana state normal school at Terre Haute. He taught school for four years and then read law in Lebanon. He was elected to the Legislature and later judge of the Circuit Court at Lebanon. In 1923 he was appointed a member of the Indiana Public Service Commission, remaining in that position six years, when he then was named special assistant attorney general.

✦

H. A. Davis

Hiram A. Davis, who went to Nashville, Tenn., from New Orleans in 1902, to become superintendent of the railway department of the Nashville Railway & Light Company, died on May 30. He served in the one capacity for twenty-eight years.

Mr. Davis was one of the city's active civic workers, and one of the city's most aggressive sponsors of the safety movement. He applied his safety principles to

H. A. Davis

his own street cars, and as a result the company established a record for safety which national authorities declared was unsurpassed. He was an active member of the Nashville Automobile Club, and the founder of the Nashville Safety Council. That his civic work was appreciated is attested by the public recognition it received.

Mr. Davis was born in Oswego, N. Y., on April 3, 1866. He was educated in the New York schools, and entered the electric railway industry as chief engineer at the power station of the Steinway Railway, Long Island City. Shortly afterward Mr. Davis went to New Orleans as superintendent of equipment of the New Orleans & Carrollton Railway, now included in the system of the New Orleans Public Service.

For fifteen years Mr. Davis was a member of the Rotary Club; he was a Scottish Rite Mason and a Shriner; he was an active church worker, being a member of the Board of Deacons of Edgefield Baptist church; he was a member of the board of directors of the Tennessee Children's Home; a member of the board of directors of the Tennessee Hermitage National Bank.

He is survived by his brother, George H. Davis, of the firm of Ford, Bacon & Davis, New York; his wife, Mrs. Isa Outwater Davis, a daughter and a son.

Digitized by Google

Col. Timothy S. Williams

Col. Timothy S. Williams, former president of the Brooklyn Rapid Transit System, now the Brooklyn-Manhattan Transit Corporation, which he served in various capacities for more than twenty years, collapsed and died suddenly in New York City on June 3 while on a visit to the city made from his estate at Huntington, Long Island.

Colonel Williams succeeded to the presidency in Brooklyn following the retirement of Edwin W. Winter. Mr. Winter had worked like a demon to snatch the system from pending receivership when he took hold and when the work of rehabilitation, which he carried out most expeditiously, was completed he turned the system over to Colonel Williams. Soon after Colonel Williams took charge the new subway contracts were negotiated, but then came the trying experiences due to the World War and in its wake a succession of economic events that the Brooklyn Rapid Transit, as a corporate entity, did not survive. During that period the system, like so many other electric railways, was almost constantly in hot water, politically, economically and financially. Colonel Williams worked prodigiously against the current of events which had set in against the company, but finally came receivership under Lindley M. Garrison and eventually reorganization with W. S. Menden, who had worked side by side with Colonel Williams, as president in complete charge of operation.

Timothy Shaler Williams was born at Ithaca, N. Y., on Aug. 1, 1862. Following his graduation from Cornell University with the class of 1884, he came to New York and joined the staff of the old *Commercial Advertiser*, as a reporter. Later, he served that paper as Albany correspondent, Washington correspondent, city editor and editorial writer. He left newspaper work to become private secretary to Governor David B. Hill, a position he also held with Governor Roswell P. Flower. Upon the retirement of Governor Flower from office, Mr. Williams undertook to reorganize the Long Island Traction Company, out of which grew the Brooklyn Rapid Transit System of companies. In 1895 he became secretary of the reorganization committee. A few months later he was named secretary and treasurer of the Brooklyn Heights Railroad. From 1901 to 1911 he was vice-president of the Brooklyn Rapid Transit System.

✦

R. H. Selbie

R. H. Selbie, general manager of the Metropolitan Railway, London, England, died recently while attending a confirmation service at St. Paul's Cathedral conducted by Bishop Perrin, at which his younger son, Andrew, was one of the candidates. Mr. Selbie was 62 years of age. He had returned on May 6 from a sea voyage of three weeks, taken for the benefit of his health. Mr. Selbie was educated at Manchester Grammar School and Victoria (now Manchester) University. He joined the staff of the Lancashire & Yorkshire Railway before being appointed in 1908 general manager of the Metropolitan Railway. He was also a director of several land and development companies. He served as chairman of the Board of Trade Committee on the utilization and feeding of horses, and was controller of horse transport at the Board of Trade and a member of the Army Forage Committee during the war. For his services he was created C.B.E. Last December he was elected chairman of the General Managers' Conference.

✦

William Gordon Gordon

William Gordon Gordon, manager of the railway and traction engineering department of the Canadian General Electric Company, died in Toronto, May 13, from pneumonia, after a short illness. He was born at Ottawa, July 22, 1877. Mr. Gordon was educated at Winnipeg, Halifax and Cornell University, taking the degree of mechanical engineer and electrical engineer at the latter in 1899. He then entered the General Electric Company's service at Schenectady, N. Y., first in the testing department. While in its railway construction department he had charge of the installation of the first electrically operated train on Manhattan elevated railway, New York. Later he assisted in installing the first multiple-unit equipment for Northwestern Elevated Railway. Subsequently, while in the railway engineering department at Schenectady, he was associated closely with the further development of multiple-unit operation for the New York Central Lines and the Interborough Rapid Transit Company. In 1905 he went to Australia in the General Electric Company's railway interests, and was manager and engineer of North Melbourne Tramways & Lighting Company. He returned to Canada in 1913 and entered the Canadian General Electric Company's service. In 1919 he was appointed manager of the Canadian General Electric Company's railway and traction engineering department.

✦

M. T. Donnelly

Morgan T. Donnelly, assistant counsel to the New York State Transit Commission and former Deputy Public Service Commissioner, died on June 30. He was 47 years old. Mr. Donnelly was appointed to his position with the transit commission on Feb. 6 and soon afterward left on sick leave. He was appointed Third Deputy Public Service Commissioner on Dec. 30, 1919, by former Governor Smith and served two years under Chairmen Lewis Nixon and Alfred M. Barrett.

✦

J. T. Branigan

John T. Branigan, general night superintendent of the Department of Street Railways at Detroit, Mich., died on June 5. Born in County Armagh, Ireland, Mr. Branigan went to Canada with his parents at the age of nine. Thirty-seven years ago he went to Detroit, and in 1899 he became a motorman on the Trumbull Avenue lines of Detroit United Railway, now included in the municipal transportation system. Later he was employed in a similar capacity on the Baker line, and in 1924 he was made assistant superintendent, in which position he remained until 1928, when he was made general night superintendent.

✦

Coker F. Clarkson, lawyer and student of electrical and automobile engineering, who had been secretary and general manager of the Society of Automotive Engineers for twenty years, died on June 4 of heart disease at his home, Sleepy Hollow Farm, Scarborough-on-Hudson. He was 60 years old.

Elmer A. Sperry

Elmer A. Sperry, famous inventor, engineer and manufacturer, died on June 16. He was in his seventieth year. He was a charter member of the American Institute of Electrical Engineers and the American Electrochemical Society and one whose inventions and activities, if not all strictly in the electrical field, all tied in closely with electrophysics. At the time of his death he was chairman of the board of the Sperry Gyroscope Company, Brooklyn.

Elmer Ambrose Sperry was born in Cortland, N. Y., on Oct. 12, 1860. He was educated at the State Normal School, and attended Cornell University, Ithaca, for a short period. A natural-born machinist and inventor, he designed in 1879, while yet a youth, a device for the perfection of one of the first electric arc lamps. This device was generally adopted. In the following year he founded the Sperry Electric Company, Chicago, to manufacture arc lamps, dynamos, motors and other electrical apparatus. This was the first of a long series of enterprises employing electricity promoted by him. They covered such diverse apparatus or fields as beacon lights of many descriptions, mining machinery, electric railway cars, automobiles, airplanes, commercial chemistry, detinning processes and the production of fuse wires.

✦

Edwin W. Winter

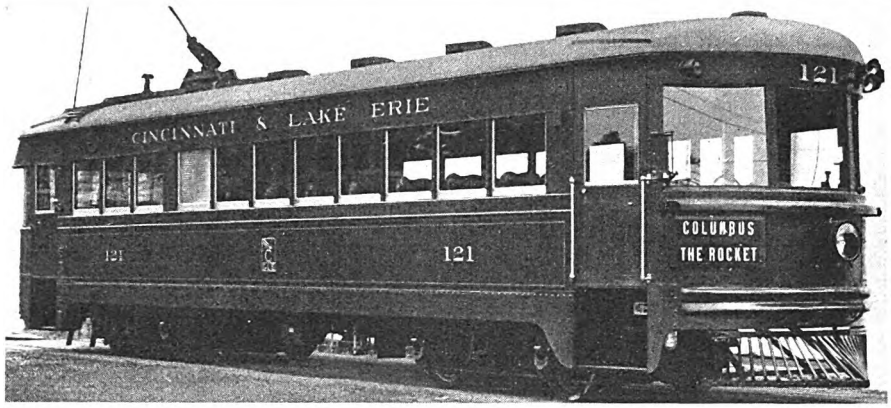
Edwin W. Winter, former president of the Northern Pacific Railroad and the Brooklyn Rapid Transit Company, died on June 28 after a brief illness, while on a visit in Fall River, Mass.

Mr. Winter left the post of president of the Chicago Transfer & Clearing Company to take over the presidency and direct the rehabilitation of the Brooklyn Rapid Transit Company in 1903 when relations between the company and the public were strained. It was understood that he was to remain only a short time, but his management was so successful that his service with the company was extended from year to year, and he did not resign until January, 1911. A diminutive man but impressive in appearance, Edwin Winter threw himself into the task in Brooklyn with great zeal, building up quickly one of the most impressive organizations, so far as personnel was concerned, probably ever assembled for a work of the kind, his most able lieutenants including J. F. Calderwood, W. S. Menden, W. G. Gove, A. S. Dutton, Dow Smith, W. O. Wood and others. His work in revamping the system attracted wide attention and received public acclaim.

Mr. Winter had been a railroad man all his life. He was born in Vermont in 1845 and when a youth, entered the service of the Union Pacific Railroad in its construction department. Later he was a contractor's agent in the construction of various railroads and then for three years was claim agent of the Chicago & Northwestern Railroad. He subsequently served with the West Wisconsin Railway as general superintendent and held a similar post with the St. Paul, Minneapolis & Omaha Road, of which he became assistant to the president. In 1897, he was made president of the Northern Pacific, relinquishing that position two years later to become president of the Chicago Transfer & Clearing Company.

Digitized by Google

INDUSTRY MARKET AND TRADE NEWS



The new cars of the Cincinnati & Lake Erie Railroad are designed to make a maximum speed of 75 m.p.h.

Cincinnati & Lake Erie Railroad Receives New Cars

Delivery is now under way of the twenty passenger cars ordered last year from the Cincinnati Car Corporation for service on the reorganized Cincinnati & Lake Erie Railroad. Earlier announcements to the effect that these cars would embody many features unusual in design have served to arouse the interest of the industry and their delivery has attracted considerable attention.

Ten of the cars, which are intended for de luxe limited service, contain a lounge compartment at the rear, equipped with comfortable movable furniture, including chairs, sofas, tables and lamps. The compartment is carpeted and is provided with wide-vision windows of plate glass. Incidental equipment includes electric fans, water-operated toilet and lavatory, iced drinking water and other features. The de luxe limited cars have been equipped with Westinghouse motor and control equipment and will weigh complete about 47,700 lb. The other ten cars, which are designed for local service, are provided with General Electric motors, control and brakes. The de luxe cars will seat 38 passengers and the locals 46. Both types are designed for one-man two-men, single-end operation. During initial trials the cars are said to have attained a maximum speed of over 75 m.p.h.

Bodies are of steel construction with extensive use of aluminum. Length over all is given at 43 ft. 9 in., with length over the body posts of 33 ft. 10 in. Width over all is 8 ft. 9⅝ in., with height, rail to trolley base, of 11 ft. 4 in. Truck wheelbase is 6 ft. 2 in., with bolster centers spaced at 23 ft. 2 in. Roof is of the arch type. Other specifications are as shown elsewhere in this issue.

Northwestern Pacific Railroad Orders New Rolling Stock

Seven motor cars and two trailers for passenger service have been ordered by the Northwestern Pacific Railroad, San Francisco, Cal., from the St. Louis Car Company, delivery to be made in September. The railway, a third rail system, is associated with the Southern Pacific lines, and operates from Sausalito, in the Marin peninsula, serving Corte Madera, Fairfax, San Rafael and communities in the Mill Valley region.

The new coaches have an over-all length of 72 ft. 10½ in., and a width over the eaves of 10 ft. 6 in. The motor cars, which are equipped with Westinghouse No. 557 E motors and mounted on trucks supplied by the General Steel Castings Corp., weigh complete 110,000 lb., while the weight of the trail cars is given as 79,200 lb. Body construction is of aluminum and steel, with arch roofs. Seating capacity of the motor cars is 98 passengers and of the trail cars 103 passengers. Additional equipment details are supplied in an accompanying table.

Single-Truck Cars for Louisiana Property

The J. G. Brill Company, Philadelphia, Pa., has recently delivered four single-truck, double-end, one-man motor cars to the municipal street railway of Monroe, La. The cars were built at the plant of the American Car Company, at St. Louis.

Body construction is all steel, with arch roof. Over-all length is 28 ft., over-all width 8 ft., and height, rail to trolley base, is 9 ft. 10⅜ in. Weight is 16,000 lb.

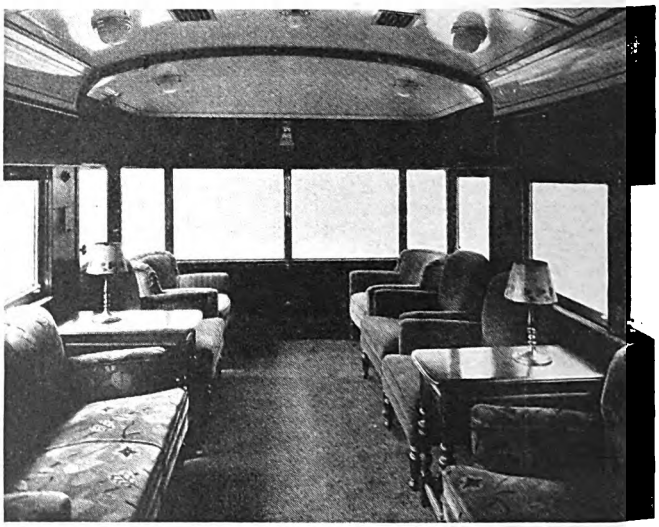
Long Island Railroad Has 85 Steel Passenger Cars on Order

To augment its passenger-carrying equipment this year, the Long Island Railroad recently placed orders for the immediate construction of 45 multiple-unit steel cars at a cost of $1,395,000. Delivery of these cars will begin in August and be completed in September.

The type of car just ordered has a seating capacity of 69 persons and the length over all is 70½ feet. The Pressed Steel Car Company of McKees Rocks, Pa., is building 25 of them, and the American Car & Foundry Company of Berwick, Pa., is constructing the remaining twenty cars.

A special safety feature of the new cars will be a door-interlocking device, or signal light, indicating to the motorman that the doors are closed. Each car will be equipped with train control apparatus. Roller bearing trucks will make riding easier, and better distribu-

Wide aisles, improved lighting effects and leather-upholstered seats add to comfort of travel on new C. & L. E. cars



Individual chairs of rich upholstery, a carpeted floor and wide-vision windows are provided in the observation compartment

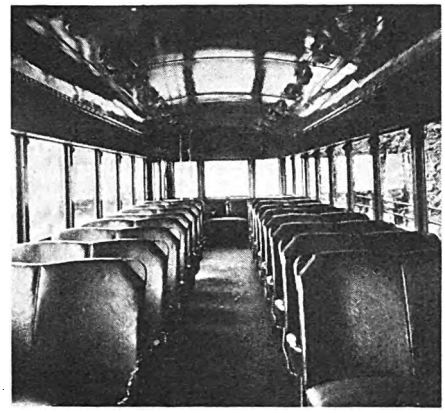
Digitized by Google

tion of lighting will be effected through the installation of additional pedestal lamps in each car and increased wattage of the lamps.

With the 40 multiple-unit cars which were delivered before June 1, the Long Island Railroad will have increased its passenger-carrying equipment in 1930 by 85 cars.

New Des Moines Cars Embody Distinctive Features

Cummings Car & Coach Company, of Chicago, has delivered 40 single-end, all steel, one-man motor cars to the Des Moines Railway for service on its city lines. In appearance the new cars follow a well-balanced design, which is attained by providing wide-vision windows, a narrow letter board and a low arched roof. Exterior painting scheme is carried out in cream above the belt rail and red below, with monogram, numbers and striping in aluminum. The interiors are finished in enamel,



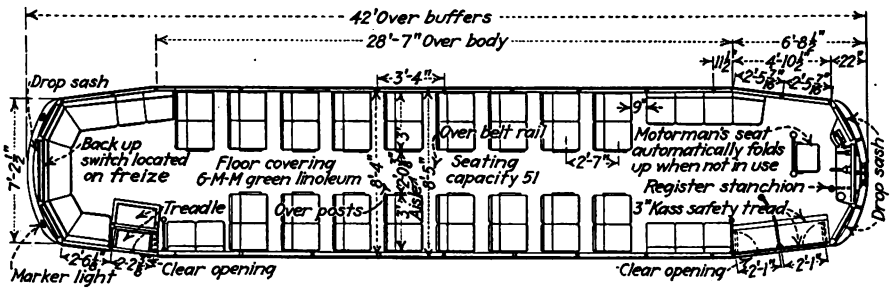
Wide aisles, upholstered seats and ample lighting effects lend a pleasing appearance to new Des Moines cars

with cream headlining. Frieze panel, post capping, sash, window capping and wainscoting are finished in three colors shading from light tan for the frieze panel to dark brown for the wainscoting, the latter matching the brown leather seats.

There are no bulkheads in the car and the headlining is continuous throughout its entire length. Illumination is provided by a large number of dome light fixtures over the center line of the seats on either side. Seats are of semi-bucket type.

Electrical equipment consists of four General Electric No. 247 motors of 40 hp. with tapped fields and K-75 control with safety features. The cars are designed for single-end operation, but are provided with back-up equipment. All doors are pneumatically operated, equipment being provided by National Pneumatic Company. Step wells are provided at front and rear. Entrance and exit doors on front vestibules are selectively controlled, with treadle control at the rear exit. Trucks are Cummings Car & Coach Company's No. 64 equalizer type with 3¼x7-in. journals.

The weight of the cars, completely equipped, is given as 35,300 lb. It is expected to attain an acceleration of 3 m.p.h.p.s., and a free running speed of 37 m.p.h. Additional details are shown elsewhere in this issue.



Des Moines cars provide seats for 51 passengers

The Okonite Company announces the appointment of Elbridge H. McNeill as manager of the power and light department of the company's Chicago branch. Mr. McNeill has had charge of certain railroad, industrial and public utility accounts for the company since 1925. Charles E. Brown, formerly manager of the power and light department of the Okonite Company, has been appointed assistant general manager of the company with headquarters in New York.

Detail Specifications Accompanying Recent Car Orders

Name of railway	Des Moines Railway	City of Monroe, La	Cincinnati & Lake Erie	Windsor, Ex. & Lake Shore	Northwestern Pacific R.R.
City and state	Des Moines, Iowa	Monroe, La	Dayton, Ohio	Windsor, Ont., Canada	San Francisco, Cal.
Number of units	40	4	20	3 motor, 1 trail	7 motor, 2 trail
Builder of car body	Cummings Car & Coach	American Car Company	Cincinnati Car Corp	Ottawa Car Mfg. Co.	St. Louis Car Company
Air brakes	General Electric	General Electric	10 Westinghouse 10 General Electric	Westinghouse	Westinghouse.
Armature bearings	Plain	Roller	Plain	Plain	Plain
Axles	3¼-in. x 7-in.	Brill "Friction"	A.E.R.E.A. Standard E-6.	A.E.R.E.A. No. E-8	U. S. Steel Products Co.
Car signal system	Cons. Car Heating Co.	Faraday	Keystone	Faraday	Westinghouse
Compressors	Chicago Pneumatic 27-B	General Electric CP-25	D.H. 16	Westinghouse D.H. 25	Westinghouse
Conduit	Duratube	Flexible loom	Flexible	Flexible and rigid	Aluminum
Control	General Electric K-75	General Electric K-63-G	10 G.E. PC, 10 Wes. HLF.	Westinghouse HL	Westinghouse
Couplers			Draw bar type	Tomlinson form 10	Westinghouse automatic
Curtain fixtures		National Lock Washer Co.	Curtain Supply Co.	National Lock Washer Co.	O. M. Edwards
Curtain material		Pantasote No. 86	Pantasote	Pantasote	Pantasote
Destination signs	Keystone type S	Hunter	Hunter	Hunter	
Door mechanism	National Pneumatic	National Pneumatic	National Pneumatic	National Pneumatic	National Pneumatic
Doors	Folding	Folding	Swinging	Folding	Sliding
Fare boxes		Johnson		None	Ohmer
Finish	Enamel	Paint	Duco lacquer	Lacquer	Pyroxylin lacquer
Floor covering	Linoleum	None	Linoleum	None	Flexolith
Gears and pinions	General Electric		Helical—forged steel	Nuttal helical	Westinghouse
Glass	Plate	Plate	Non-shatterable at front and rear vestibules and front bulkhead	Plate	Plate
Hand brakes	Pittsburgh No. 35	American Car Company	Peacock staffless	Peacock	W. H. Miner
Heat insulating material			Compressed cork	Cork	
Heaters	Railway Utility Co.	Railway Utility Co.	Cons. Car Heating Co.	Canadian General Electric	Railway Utility Co
Headlights	Golden Glow type SM-95	Golden Glow type SM-95	Ohio Brass	Ohio Brass	General Electric J-28
Headlining	¼-in. Agasote		Agasote	Agasote	
Interior trim	Enamel—light tan to br'n	Birch	Wal. fin. alum. and cherry	Birch	Aluminum
Journal bearings	Plain	Plain	More-Jones Hi-speed	Plain	Plain, Magnus Co.
Journal boxes	Cummings Car & Coach	Brill "Friction"	Pedestal type 4½x8 in.	Cast steel	Symington
Lamp fixtures	El. Serv. Sup. dome type	General Electric	Model T		
Motors	General Electric No. 247	General Electric 264-A	10 G. E., 10 Westingh'se	Westinghouse No. 548	Westinghouse 557-E
Painting scheme (color used)	Exterior—cream and red	Chrome yellow	Tuscan red	Blue and yellow	Tangerine
Registers	Ohmer No. 3		National Cash Reg. Co.	None	
Roof type	Arch	Arch	Arch	Arch	Arch
Roof material	Wood—canvas covered	Wood—canvas covered	Wood—canvas covered	Wood—canvas covered	Aluminum
Safety car devices	General Electric	General Electric	Safety Car Devices Co	Westinghouse	
Sash fixtures	Dayton	Adams & Westlake			
Seats		Amer. Car Co. "Waylo"	Hale & Kilburn No. 900D	Heywood-Wakefield	Hale & Kilburn No. 392A
Seat spacing	31 in.	28½ in	33 in	32½ in	32 in.
Seating material	Leather	Wood and rattan	Leather	Plush and leather	Leather
Slack adjusters	Cummings Car & Coach	Brill	Anderson	Westinghouse	Westinghouse type J
Steps	Stationary	Folding	Stationary	Folding	Stationary
Step treads	Kass	Kass	Safkar		Kass
Trolley catchers	Ohio Brass	Keystone	Ohio Brass	Ohio Brass retrievers	Third rail used
Trolley base	General Electric	U. S.-20 Form A	Ohio Brass		
Trucks	Cum. Car & Coach No. 64	Brill 79-E-1	Cin. Car Corp. ABC-740	National Steel Car Co.	General Steel Cast's Co.
Ventilators	Railway Utility Co.	Brill "Exhaust"	Nichols-Lintern type C	Nichols-Lintern	Globe
Wheels, type	Rolled steel, 26 in.	Cast iron, 26 in.	Rolled steel, 28 in.	Rolled steel, 33 in.	Wrought steel, 36 in.
Wheelguards or fenders	H B type	H B type	Pilot type	Steel pilots	Pilots

Digitized by Google

Bus Deliveries Continue in Steady Volume

In spite of a continued industrial inactivity in many lines, the purchase and delivery of buses and trolley buses by electric railway properties and their subsidiaries has continued at a steady level, according to advices received from manufacturers. General Motors Truck Company reports deliveries for May as the largest in the company's history, with good prospects that the record would be continued in July and August.

Among the larger deliveries reported by this manufacturer were 127 buses for city service, Type "250," to Public Service Co-ordinated Transport; ten Type U, 21-passenger city service buses to the Reading Transit Company; fourteen Type Z-225 buses to Toronto Transportation Commission; ten Type "250," 33-passenger observation parlor buses to the People's Rapid Transit Company, Philadelphia; four Type Z, 29-passenger city service buses to Washington Railway & Electric Company; one Type Z-38, city service bus to Worcester Consolidated Street Railway; and two Type "250," 33-passenger observation buses to Fort Dodge, Des Moines & Southern Transportation Company. The popularity of the Type U, 21-passenger city type bus is attested by the fact that three were delivered to Pittsburgh Motor Coach Company; two to Sioux Transit Company, Sioux Falls, S. D.; five to Georgia Power Company; two to Virginia Public Service Company, for service in Hampton; two to Central Illinois Transportation Company, Springfield, Ill.; and three to British Columbia Electric Railway.

Mack-International Motor Truck Corporation reports deliveries of four 29-passenger city type models to Durham (N. C.) Public Service Company; three of the same type to Fonda, Johnstown & Gloversville Railroad; one to Holyoke Street Railway; two to Public Service Co-ordinated Transport, and one Model BK intercity type bus to Tacoma Bus Company.

White deliveries include eight Model 65A buses to Virginia Electric & Power Company, for service in Norfolk; nine Model 54 buses to West Penn Electric Company; four Model 54A buses to Boston, Worcester & New York Street Railway, of Framingham, Mass.; seven Model 65A buses to Northern Texas Traction Company, of Fort Worth, and three Model 54 buses to Los Angeles Railway.

Among A.C.F. deliveries were five 40-passenger metropolitan type buses to Boston Elevated Railway; three 23-passenger street car type buses to Illinois Power & Light Company; one 40-passenger metropolitan bus to San Diego Electric Railway, and one 23-passenger electric drive street car type bus to Citizens' Transit Company, Oil City, Pa.

Twin Coach Corporation reports deliveries to Boston Elevated Railway of five urban type buses; seven to Schenectady Rapid Transit Company; two 24-passenger buses to El Paso Electric Company; eight 21-passenger buses for city service to Oakland, for Key System Transit Company, and six trolley buses to the Department of Street Railways, Detroit.

One-Man Double-Deck Buses for Baltimore

Baltimore Motor Coach Company, a subsidiary of the United Railways & Electric Company of that city, is to place twelve double-deck electric-drive buses in service. The units, with seating capacity for 68 passengers, will be operated in the Charles Street service, where a grade of 9 per cent must be negotiated. The twelve gas-electric buses are to replace fourteen mechanical-drive buses at present in service.

Before securing the new buses the company made an investigation of the practicability of operating a double-deck gas-electric bus with one man. After tests with a sample equipment and analysis of operating conditions in Baltimore and other cities, it was concluded that such operation was practicable.

Pacific Electric Completes Repair Layout at Long Beach

Representing an investment of $270,000, complete new quarters for the housing, repair and supplying of power to its Long Beach division have been completed by the Pacific Electric Railway. The new facilities replace structures more centrally located, which, due to the phenomenal growth in population of Long Beach, had become too valuable for the purposes used. The new layout is designed to meet not only present but future needs.

The principal structure in the group is a carhouse, which is 77x222 ft. It is substantially constructed with steel frame, corrugated transite siding and roof, steel sash and concrete floor. There are 6,621 lineal feet of trackage and 29,420 sq.ft. of oil macadam paving to serve the various structures. Facilities within the carhouse consist of locker rooms and toilets, shop, store and line department offices and the repair shop. Four car pits are provided, as well as track capacity for the storage of fourteen cars.

In addition to the necessary repair and maintenance equipment, the bus garage, which is 65x77 ft. in size, provides store room, office, locker room and oil room. Storage capacity is also provided for 6,000 gallons of gasoline. The substation unit, which is of fireproof construction, has a capacity of 1,600 kw., supplied by two motor-generator sets, one of 600-kw. and the other of 1,000-kw. capacity. Other structures include a lineman's three-car garage, a four-car concrete wash rack of special design, and a sand house.

Ample fire protection for all units has been provided by placing fire hydrants at suitable locations throughout the buildings and yard. The entire layout was designed and constructed under the direction of the company's engineering department.

New Cars Received by Canadian Property

Three double-truck, double-end motor cars for interurban service on the Windsor, Essex & Lake Shore Railroad, a division of the Hydro-Electric Power Commission of Ontario, were delivered during July by the Ottawa Car Manufacturing Company. The cars, which will seat 50 passengers, are of all steel construction, with arch roofs. Length over all is 51 ft. 2 in., with length over the body posts of 37 ft. 10 in. Over-all width is given as 8 ft. 3 in. Four Westinghouse No. 548 motors are provided, with Westinghouse H.L. control. Weight of the completed unit is given as 63,000 lb. The order also includes a trail car of the same general dimensions.

Additional equipment specifications are listed elsewhere in this issue.

Electric Railway Material Prices—July 5, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	12.00
Lead, cents per lb.	5.25
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	4.50
Tin, Straits, cents per lb.	30.25
Aluminum, 98 to 99 per cent, cents per lb.	23.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	41.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$3.90
Somerset mine run, f.o.b. mines, net ton	1.75
Pittsburgh mine run, Pittsburgh, net ton	1.40
Franklin, Ill., screenings, f.o.b. mines	1.60
Central, Ill., screenings, f.o.b. mines	1.25
Kansas screenings, Kansas City	1.85

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ⅝ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.08
Angles bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.80
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.40

Hardware—Pittsburgh

Wire nails, base per keg	$2.20
Sheet iron (24 gage), cents per lb.	2.55
Sheet iron, galvanized (24 gage), cents per lb.	3.20
Galvanized barbed wire, cents per lb.	2.85
Galvanized wire, ordinary, cents per lb.	2.80

Waste—New York

Waste, wool, cents per lb.	10.00 to 15.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	9.00 to 12.00
Colored	6.00 to 10.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	14.2
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	0.54
Putty, 100 lb. tins, cents per lb.	5.725

Wire—New York

Copper wire, cents per lb.	13.75
Rubber-covered wire, No. 14, per 1,000 ft.	$5.05
Weatherproof wire base, cents per lb.	14.00

Paving Materials

Paving stone, granite, 5 in., f.o.b.:	
New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	9.25
Light copper, cents per lb.	8.00
Heavy yellow brass, cents per lb.	5.50
Zinc, old scrap, cents per lb.	2.00
Lead, cents per lb. (heavy)	3.75
Steel car axles, Chicago, net ton	$15.25
Cast iron car wheels, Chicago, gross ton	13.75
Rails (short), Chicago, gross ton	14.00
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	6.50

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Managing Editor*

Volume 74 New York, August, 1930 *Number 9*

Chicago Transit Settlement a Message to the Industry

CHICAGO'S display of good sense in passing the franchise ordinance providing for co-ordination of transit facilities was more than a victory for the companies involved. Important as it was to the city and the local railways, the adoption of the ordinance really was a victory for the entire industry in that it recognizes more effectively than do other modern grants, the right of the companies to live and the community of interest that exists between them and the municipality.

There is a far-reaching civic aspect to settlements of this kind, and Chicago took that aspect properly into consideration. The rapid transit lines, with a 50-year renewable franchise granted under the steam railroad law, were in a good position. On the other hand, the grant of 1907 under which the Surface Lines was operating was limited to a term of twenty years in accordance with state corporation law. For nearly this entire period it has been difficult to obtain money for development of the property to meet the city's growth. In the face of the expiring franchise and the uncertainties that necessarily are a part of negotiations for a new grant, however, the Surface Lines never let down. By this attitude the railway built up public good will which was an influential factor in the favorable outcome of the recent referendum.

In the new deal, recognition has been secured of the right of the companies to live. The principles have been established that they are entitled to rates that are self-sustaining, that subways shall be built with city money and by the assessment method, that the terminable permit is a sound device, that valuation is more than a matter of barter and trade and should be carried forward on a basis of fact, and that any excess earnings over an amount needed by the companies to carry on aggressively day by day shall go to the general improvement of the system at once. These are matters of great significance as reflecting changed points of view—points of view that augur well for Chicago in the future.

In addition, the new grant is significant in that it recognizes the fact that a comprehensive program of rapid transit development should be the backbone for the future, while it takes full account of the need for the intensive use of the street car, the bus and the trolley bus, in their respective fields. In the future the character of the traffic carried on the surface lines is likely to change greatly. As they lose in through riders, they will become increasingly important as feeders. Now only 20 to 30 per cent of the total of passengers carried in Chicago are transported on the rapid transit lines. Under unification these proportions may be expected to change, but only to the extent that scientific planning shall determine.

Already a start has been made on the program of improvements—a start that calls for the immediate expenditure of $12,000,000 even before formal acceptance of the grant has been filed on behalf of the new consolidated company. Articulation and rapid transit planning are going ahead. The more pretentious parts of the $200,000,000 program calling for rapid transit construction must necessarily proceed slowly toward realization, but co-ordination of existing facilities and the building of supplementary surface tracks and the installation of bus and trolley bus lines will go forward at once and as fast as is consistent with careful planning.

Politics Should Not Be Permitted to Seep Into Utility Regulation

DISQUIETING proposals have appeared of late indicating politics is likely to play a larger part in utility regulation in the future than it has in the immediate past. Not long ago the governor of New York spoke of the need for "a strong-arm man who will bring the [Public Service] commission back to its original role of defender of the public interest." During recent sessions of the legislatures of various states, a number of ill-considered and impracticable measures, aimed at the utilities, were introduced. The cry has been raised that it would be better for the state to own the utilities than for the utilities to own the state. While the electric railways were not, in most instances, the primary targets of the law makers, the industry cannot afford to stand aloof on the side lines and watch.

Utility regulation has evolved painstakingly. Many utility heads have accepted the idea reluctantly, but the majority have realized its advantages. They were for it in the beginning and they are for it now. Those who have done things in contravention of the regulatory law, however, have been sufficient in number to give political promise to the cry that regulation has broken down. By its very nature regulation, born as the result of popular hue and cry against the utilities, has always been susceptible to the charge of manipulation. The original idea was to take the utilities out of politics by means of regulation. In this a considerable measure of success was achieved. But of late it has been apparent that politics is playing an ever increasing part in regulation. Therein lies a serious menace to the future of the utilities.

High-minded men in the industry sense the growing menace. Supine acceptance of regulation by the utilities is one thing: unyielding opposition to the exercise of the right of the state to have a hand in the control of its own creatures, is something quite different. The question is not merely whether certain practices are legal, but whether under present economic and social conditions, they are in the public interest. The situation is

Digitized by Google

fraught with grave dangers. The utilities can meet it most successfully by keeping the public informed on fundamental principles of valuation, rate-making and similar subjects which are the chief concern of regulation. The idea of regulation is sound. The menace to regulation lies in its possible political perversion. Any serious threat at the commissions imperils the railways.

Merit Alone Should Control Substitution of Buses for Cars

THAT something should be done to improve surface transportation facilities in New York City has long been apparent. Recently attention has been focused anew on this important subject by the proposal of the New York Railways to substitute buses in place of cars on all of its lines. As the interests which now control this company have always been staunch advocates of the bus as a mass transportation vehicle, it is not surprising that they should suggest buses as the solution of the problem. Moreover, there has been considerable public and political agitation for the creation of an extensive system of bus routes in Manhattan. The establishment of such a bus system upon a competitive basis would almost certainly have a ruinous effect upon existing street railway lines. Substitution of buses for cars on the routes of the New York Railways might, however, forestall the establishment of an independent bus system.

That the proposed wholesale substitution is actually the best solution of the surface transportation problem seems doubtful. Conditions are not the same on all of the routes of this company, and the type of vehicle which is best suited for one is likely to be unsuitable for another. The particular needs of each route should be studied. Where the bus is a better vehicle than the street car to meet these needs, the substitution should be made. Where the street car is a better vehicle, it should be retained.

Exaggerated ideas of what can be accomplished by bus substitution are prevalent. While the bus is an excellent vehicle for certain purposes, those who expect to find in it a miraculous cure for all of New York's transportation troubles are doomed to disappointment. Many of the advantages which the bus possesses under favorable circumstances would be lost under the conditions existing in mid-town Manhattan.

For example, one of the ordinary advantages of the bus is its ability to draw up to the curb to receive and discharge passengers. In New York, however, the advantage actually gained through this flexibility is comparatively small. With almost universal parking, the curb is inaccessible. Even where there is no parking, buses seldom pull in closer than 5 or 6 ft. from the curb. No doubt it is easier for a prospective passenger to wait on the sidewalk and step out this short distance to board a bus than it is for him to wait unprotected in the center of the roadway for a street car. But there is no reason why he need wait without protection. The safety isles used in scores of other cities provide waiting places as safe as the sidewalks. They could be used equally well in New York.

Speed is often cited as an advantage of the bus, but this advantage could not be realized on New York's congested streets, where all vehicles have been forced to crawl because of the system of traffic control. At present the car speed on the New York Railways averages 6 m.p.h., while the average speed of the Fifth Avenue Coach Company's buses is a little more than 7 m.p.h. The latter, however, includes considerable operating outside the congested area. In Chicago, where modern traffic signals are used and all parking is prohibited in the business district, the average speed of street cars is 11.44 m.p.h., and even in the most congested section, the Loop, it is between 6 and 7 m.p.h. From this it would appear that speed depends on traffic conditions rather than on the type of vehicle.

A widespread belief prevails that general substitution of buses for cars would contribute to the relief of traffic congestion. In reality, the result would probably be to make congestion worse on heavily traveled routes, as more vehicles would be required to handle the same number of passengers and these vehicles would be weaving in and out across several lanes of traffic, instead of moving in a straight line in the center of the street.

On heavy traffic lines the bus possesses no advantage over the modern car from the standpoint of operating cost. Because of the age and worn-out condition of its equipment, the present operating cost of the New York Railways is extremely high, being in excess of 53 cents per car-mile, while revenue is 66 cents per car-mile. Buses certainly could be operated for considerably less than 53 cents per mile. In fact, the costs of the Fifth Avenue Coach Company are now about 45 cents per mile. If buses were substituted in place of cars, however, a considerable increase in the number of vehicle-miles would be required to accommodate the heavy traffic, and the receipts per bus-mile would be materially less than present car-mile receipts. On the other hand, experience in other cities shows that modern street cars can be operated for less than 40 cents per mile, and their use in New York would permit a reduction from the number of car-miles now operated with a corresponding gain in car-mile receipts.

In view of these facts it appears that complete substitution of buses for cars on all the lines of the New York Railways would be a mistake. While improvement in surface transportation facilities is urgently needed, it would be well to proceed with sufficient deliberation to assure the selection on each route of the type of vehicle which is best suited to meet its particular transportation needs.

City Transit Problems Are Becoming Better Understood

TRAFFIC engineers, city planners and operating officials of public transit facilities have long recognized that the street car, the bus and the taxicab have definite places in the general scheme of urban transportation. Transportation to be successful must be profitable. Uncontrolled and unregulated competition has always proved detrimental to profits. Not only do the operating companies suffer, but the service rendered to the public also suffers.

That these simple facts are becoming more widely understood is encouraging. Publications other than those of the technical press are discussing traffic and transportation problems more frequently. Editors are presenting to their readers the basic problems of city transit and are appealing for support in their solution.

In a recent issue of the *Saturday Evening Post* the leading editorial discussed the subject of co-ordinated transportation and particularly the evils resulting from cut-rate or low-rate taxicabs. It was pointed out that

Digitized by Google

in the great majority of places the street car easily carries the bulk of the load, and that no substitute can take its place because of the inherent lack of street room. "Buses, taxicabs and private automobiles are all important and desirable," continued the editorial, "but they are less essential than the street car or subway, where there is one, and city transit cannot reach its proper goal until this fact is taken more fully into consideration by city planners and traffic experts."

Appealing for regulated co-ordination the editorial continued: "Just as the street railway deserves a living wage, so does the taxicab. Just as one is a proper subject for strict regulation by a utilities commisison, so is the other. It is difficult to see how conditions can be anything but chaotic unless the number of taxicabs are regulated and unless reasonable fares, both maximum and minimum, are provided by public utility."

Views such as these, based on sound reasoning, presented in an unbiased manner to the millions of readers of the *Saturday Evening Post* undoubtedly will have a far-reaching effect.

Few Pension Plans on a Sound Basis

PENSION plans for veteran electric railway employees appear to be approaching a critical period in their development. In one recent instance, it was necessary to revise pension rates downward because the expense threatened to become too heavy for the company to carry. On another subway system, additions to the pension roll have been temporarily suspended for a similar reason. Confidential replies received to an inquiry recently made by the JOURNAL indicate that a considerable number of electric railway managers are apprehensive concerning the future status of their pension plans. Evidently it is time for the industry to pause and consider the situation carefully.

Apparently the difficulty arises because a majority of the present pension plans were not originally established on a sound actuarial basis. The payment of benefits is now found to be exceeding the early estimates. In part, this is due to the increase which has occurred with the passage of time in the number of eligible employees. In part, it is due to the present high wages upon which the pensions are calculated, which were not foreseen when the plans were first established. There is a cumulative effect which must be viewed at long range to be fully appreciated, and few railways appear to have realized at the beginning what the ultimate results would be.

With the exception of a small number of railways which have established reserve funds, it is the practice to make current pension payments out of current earnings. In this the electric railways are following the practice imposed upon the steam railroads by the Interstate Commerce Commission. It is inevitable, however, that with obligations increasing steadily, difficulties will be encountered in making pension payments by this method. No company should agree to make a future obligation without at the same time making some provision for funds from which to pay it.

Despite the difficulties which are being encountered, the railway executives replying to the JOURNAL's inquiry were unanimous in expressing the belief that the railways should provide pensions for veteran employees. This is not a matter of charity, but of sound business practice. To be successful, however, pension plans must be based upon something more than good intentions and guesswork.

Increasing Speed Through Detailed Analysis

SPEED is one of the most vital factors in modern surface car transportation. Passengers are interested in comfort, convenience and attractive appearance of cars, but they are even more interested in speed. If one of the original electric cars of 40 years ago could, by some magic, be made to travel at 40 miles an hour, it would undoubtedly be able to take away business from the more comfortable and attractive electric car of today, operated at present speeds. Only in so far as its speed enables it to hold its place in traffic, can the electric railway car hold its place in the transportation scheme.

All this is well understood by electric railway men. Merely to say that speed is essential, however, accomplishes little. The vital question is how to increase present speeds. So many difficulties lie in the way of achieving this objective that operating officials frequently become discouraged. Perhaps one reason for this is that the problem is usually looked at in its entirety. Viewed in that way, the difficulties appear exceedingly formidable. But if the problem is broken down into component parts and each part considered by itself, the obstacles no longer seem insurmountable.

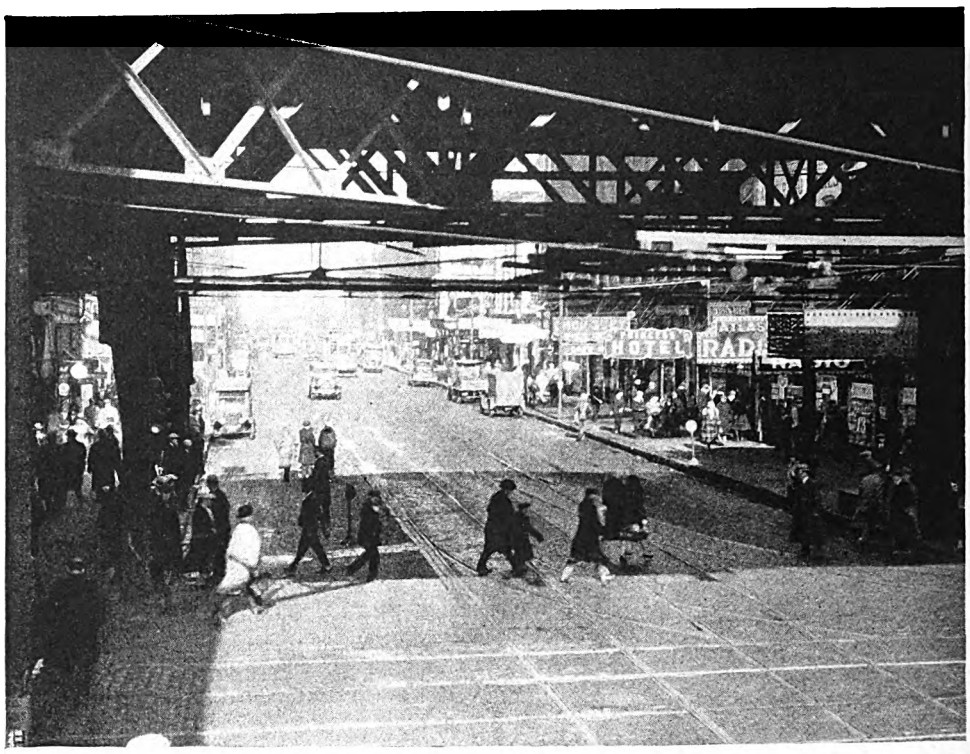
The first step in this direction might well be to make a detailed analysis to determine accurately the actual speed on short sections of each route. Preferably, the limits of these sections should not correspond with old established time points, but should be points arbitrarily selected at approximately equal distances along the line. Such an analysis will show a wide variation between the speed on some sections and the speed on others, and it is quite likely that loss of time will be disclosed at unexpected places. By attacking these problems one by one, a number of small improvements can be made which, in the aggregate, will produce a substantial reduction in the over-all running time.

Many of the contributory causes of slow operating speeds are within the control of the railway. Frequently it will be found that the acceleration and braking rates are too low. Perhaps the cars have not sufficient power to negotiate the grades. It may be that the entrance and exit arrangements prevent quick loading and unloading of passengers. Sometimes it is wrongly supposed that safety demands slow speeds. Or it may be that time is lost because of long established operating customs that could easily be changed. Looking at the problem as a whole, it is often difficult to discern the true reason for slow operation. Looking at it in detail, the reasons soon become evident.

The method of detailed analysis is valuable also in studying conditions outside the immediate control of the railway. A widespread tendency exists to blame traffic congestion for most of the delays which occur in street car operation. Certainly there is considerable justification for this attitude. But the municipal authorities are probably doing the best they know how to speed up traffic movement. Specific suggestions are of infinitely more value than a general indictment of existing conditions. If a particularly bad situation is pointed out to them and a means of improving the railway service suggested, the municipal authorities will usually be entirely willing to co-operate in effective improvement.

No magic solution of the problem is likely ever to be found. But the first step in effecting improvement is exact knowledge of what the trouble is, and where it occurs. Only by detailed analysis can these questions be answered.

Digitized by Google



Clark Street, one of Chicago's principal thoroughfares, passes through the heart of the famous Loop district. This picture is looking north from Van Buren Street

Chicago to Have

Immense Transportation

RATIFICATION, on July 1, by a vote of 325,837 to 56,690—nearly six to one—of the new Chicago transportation ordinance marked the completion of the efforts of the city authorities, public bodies and the companies involved, to arrive at a plan to give the city of Chicago and the entire metropolitan area a unified local transportation system. The campaign has been prolonged many years and has gone through vicissitudes of various sorts, but out of it has been evolved a plan which should give Chicago a type of local transportation second to none in the world.

The ordinance, which was passed by the City Council on May 19 by the affirmative vote of 47 of the 50 aldermen, calls for a comprehensive unified local transportation system for Chicago and the metropolitan area. It is based on principles which long have been agreed to by leaders of thought on the subject. Elevated lines, subways, surface cars and buses are included in the plan. In addition to the consolidation of systems, a city-wide program for extensions, additions and improvements to the transit system is mapped out in the ordinance. The new company which is now being formed, to be known as the Chicago Local Transportation Company, will be required to expend at least $200,000,000 during the first ten years of the grant, in the construction of extensions and additions which are specifically described in the ordinance. Of this sum, $65,000,000 must be expended during the first three years of the grant. Thus the project provides not only for a system adequate for the immediate needs of the city but capable of expansion to meet future demands. Further extensions, additions and improvements may be required by order of the Transit Commission upon the authorization or direction of the City Council. Many more extensions and additions may be required during the first ten-year period as well as thereafter.

Twice before ordinances for unification of the transit facilities in Chicago have been prepared and adopted by the City Council. But both were defeated at the polls. In addition, numerous plans have been worked out in more or less detail which have been discarded before being brought to a vote. It is needless to recapitulate here the various projects that in the past have been suggested for solution of the transportation problem. They have been discussed in detail in this paper from time to time.

The ordinance, in its final form, represents the united efforts of the City Council's committee on local transpor-

Digitized by Google

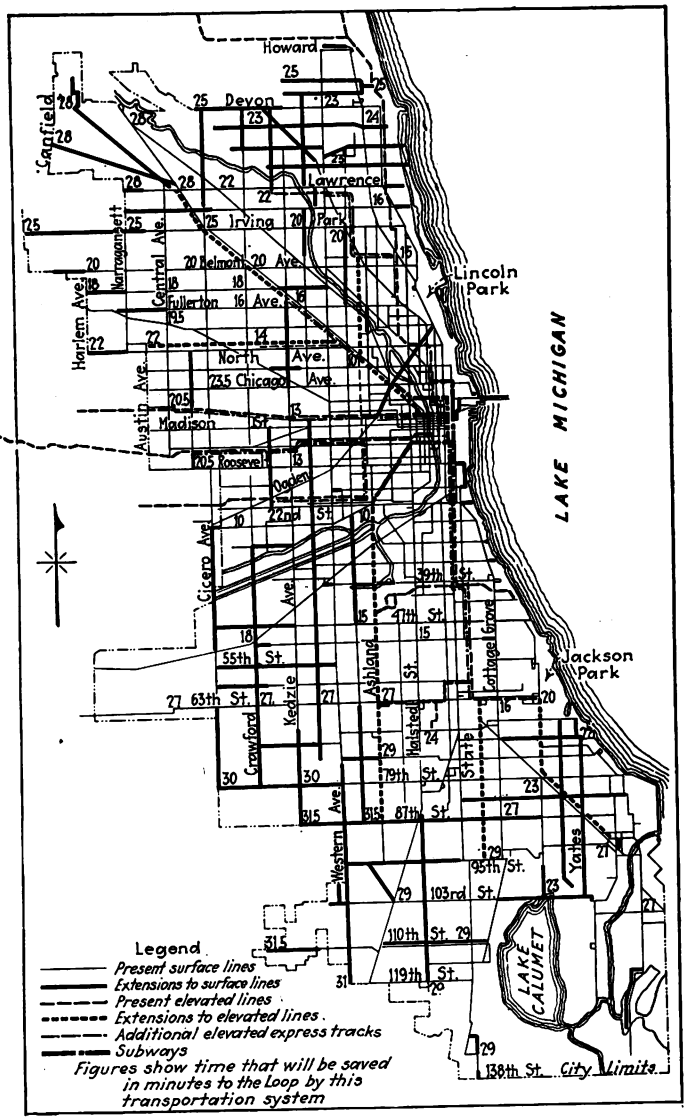
tation, of which Joseph B. McDonough, alderman of the Thirteenth Ward, is chairman, and its sub-committee, aided by the Citizens' Traction Settlement Committee and various civic organizations. The work on this draft of an ordinance dates back to June, 1928, and its provisions are based on legislation obtained at the last session of the Illinois General Assembly. This legislation was necessary to remove certain bars which stood in the way of the consolidation. One of these was that the elevated lines were organized under the steam railroad law, while the surface lines were organized under the street railway law. Another was the removal of the definite twenty-year term from the franchise, which was the maximum permitted in the state.

Home Rule a Feature

Provision is made in the ordinance for a comprehensive unified local transportation system, operated under a terminable permit by one corporate management, and subject to control of a local home rule commission of three members to be appointed by the Mayor. In addition to the

Ratification by voters of ordinance for unified transit assures construction in ten years costing $200,000,000. This includes rapid transit, surface cars and buses. In addition the city will construct subways costing $100,000,000. Details of the ordinance are given

Development



This map of the Chicago transportation system indicates how the $300,000,000 will be spent within the next ten years

The extensions include 300 miles of surface lines and 110 miles of single track for the rapid transit system. This will amount to an increase of 30 per cent in the surface lines system and 56 per cent in the rapid transit system. Subways are included for the central business district, but they will be constructed by the city at its expense. The plans also include the purchase of 1,000 rapid transit cars and 1,000 surface cars or buses.

expenditure of $200,000,000 by the company within the ten-year period, the city is to build a subway system in which it will invest the sum of $100,000,000 and for which the company will provide equipment and operate cars as a part of the rapid transit system, the cost of the subways to be met by use of the city transit trust fund and such special assessments as can be levied upon the property especially benefited.

The initial rates of fare provided in the ordinance are to be unchanged from those at present existing on the rapid transit and surface lines. There is, however, a provision that transfers will be issued between the two systems. Free transfers will be given from the rapid transit lines to the surface lines, and transfers will be given from the surface lines to the rapid transit lines on payment of 3 cents. Universal transfers on all of the surface lines and on all the elevated lines are to be maintained, providing for a continuous ride in one general direction over the entire system.

Under the new ordinance the company is to pay, as compensation for the use of public property, 3 per cent of its gross receipts, plus any excess in any fiscal year over a just and reasonable return as fixed from time to time by the local transit commission. The gross receipts of the existing traction companies for the year 1929 were $83,985,242, of which 3 per cent would amount to $2,519,557. This is slightly less than 55 per cent of the net receipts for the year, which is the amount that would be paid under the present arrangement with the surface lines, plus the small amount received from the elevated lines. This 3 per cent, however, will increase in amount with the growth of population and traffic and with any increase in the rate of fare, while the net receipts may be substantially reduced by increased operating expenses, such as the employee pension fund.

The present traction fund of $61,250,620 is to be turned over to the city transit fund or utilized in such other manner as the city may provide for the construction of the initial subways. Following this construction the city may, if it wishes, apply the fund to future subways or subway extensions and to certain relatively minor purposes specified in the ordinance. The primary purpose

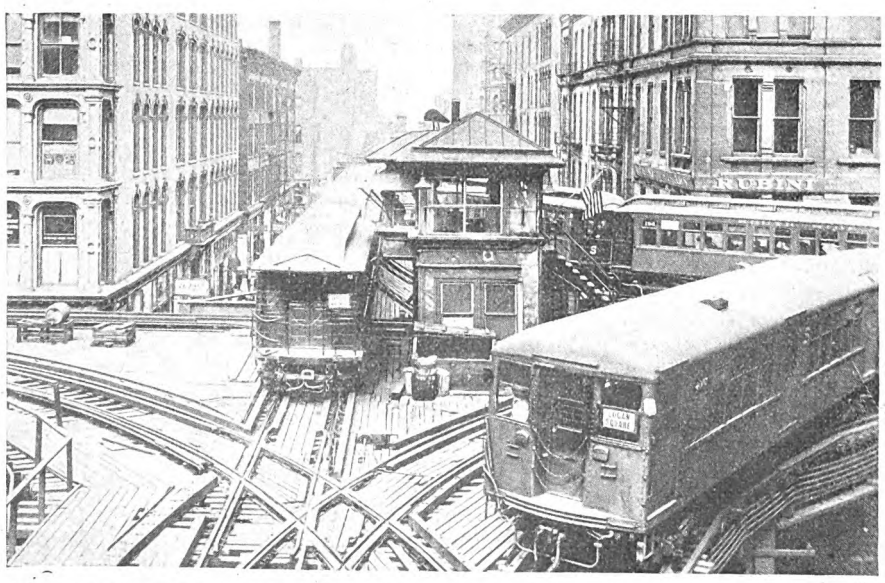
Digitized by Google

One of the latest cars of the Chicago Surface Lines, recently put in service

of this fund, however, is the amortization of the capital value of the company and the corresponding reduction in the purchase price at which the city or its permittee may take over the property, and also the corresponding reduction of the investment upon which the just and reasonable return to the company is based under the law as now declared by the state and federal courts.

The city is to have the right to purchase the traction properties at any time upon payment of the company's then unamortized capital value, and may designate a permittee which shall also have the right of purchase, subject to the provision that the permittee shall pay an additional percentage of the capital value if the purchase is made during the first twenty years. The ordinance also contains specific provisions for amortization applicable to special conditions such as the removal of the elevated loop, the sale of real estate or other property, the application of insurance money now used to replace the property insured, and the application of the renewal fund for amortization when property is retired or abandoned and not replaced.

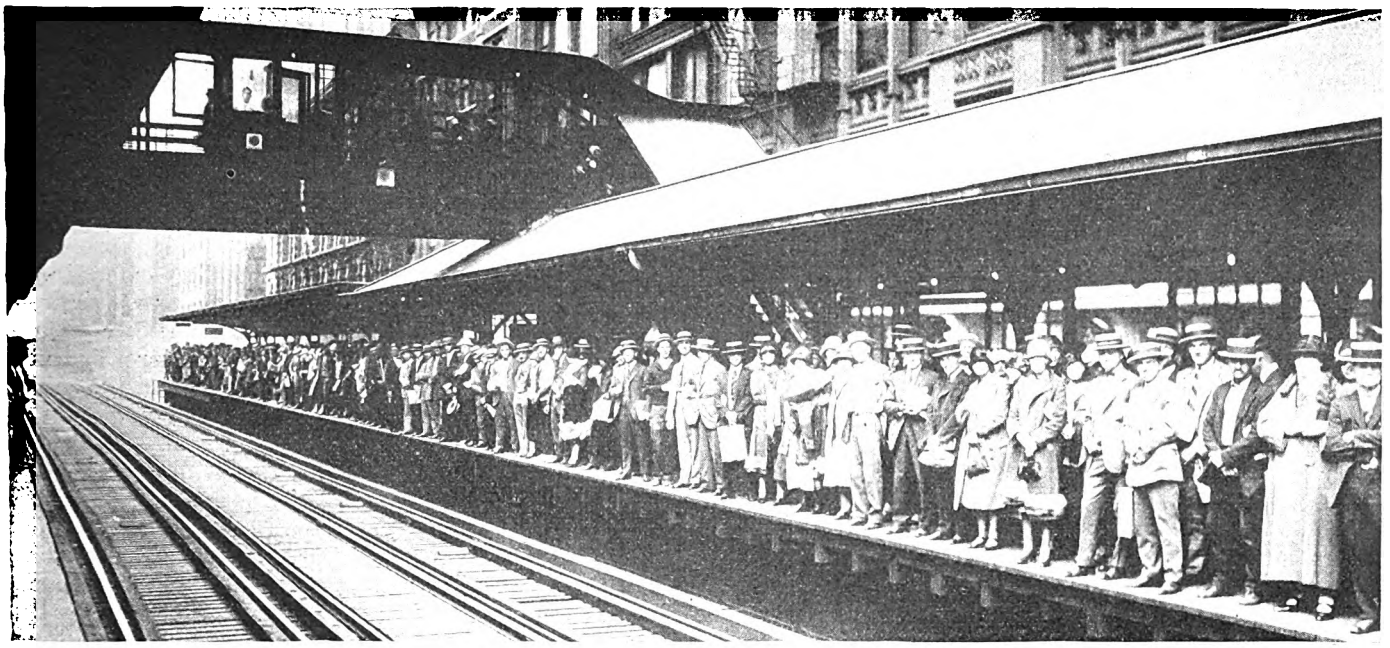
Before the new company can accept the ordinance it must acquire all the properties and rights of the existing street and elevated railroads. The total or aggregate value of these properties is agreed to be, as of Aug. 31, 1929, the sum of $260,442,063, with appropriate adjustment of this value by actual capital additions and deductions to the date of actual acquisition. The company is given the right to purchase these properties subject to certain existing mortgages or liens of the rapid transit company. The reason for this is that there is no effective method by which the Chicago Rapid Transit Company can remove these mortgages or liens except at an unjustifiable cost to the company. They will, therefore, be allowed to run until maturity, when they will be replaced by other securities of the new company subject to the provisions of the ordinance.



This intersection at Lake and Wells Streets, the northwest corner of the Loop, is said to be the busiest railroad crossing in the world. In the maximum hour, 224 trains of 1,244 cars pass through it

The valuation of $260,442,063 was arrived at by adding to the purchase price or capital value of the properties of the surface lines under the provisions of the ordinance of 1907, the present value of the rapid transit system as appraised at the request of the City Council's committee on local transportation. This appraisal was confined to the physical properties; nothing was included for franchise rights or other intangibles. Leading authorities agree that this valuation is fair and is fully in

Digitized by Google



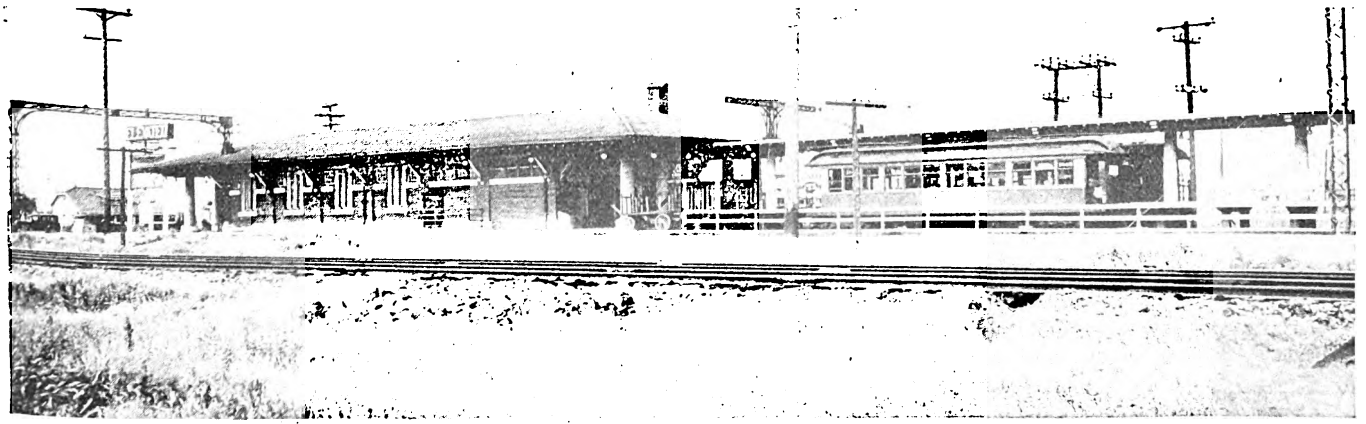
A daily scene in the rush hour. One of the platforms of the Adams and Wabash Station of the Elevated. Here both tracks run northward

accord with the earlier legislation. To this initial capital value is to be added in the future only the actual expenditures in money for additions to plant and property, as approved from time to time by the transit commission, together with such amounts as the company may supply with the approval of the commission for working capital. In the event of purchase by the city or its permittee, the working capital as well as the properties constituting the system will be required by the purchaser.

Necessity for rapid transit improvements is recognized in the ordinance, and a certain amount of central subway construction is specifically provided. There is to be a four-track north-and-south subway on State Street from a junction with the present elevated lines at Chicago Avenue to a junction with the present elevated lines near Sixteenth Street. This will immediately relieve the elevated loop and enable it to be utilized for rapid transit facilities primarily serving the west side. An additional subway primarily serving the west side, which includes northwest and southwest, is to be constructed by the city within the ten-year initial construction period. For transfer from one subway to another and between the elevated structures and subways conveniently and without either transfer slips or additional fare, six pedestrian tunnels or passageways are to be constructed. These subways are imperatively needed to accommodate the traveling public which desires to pass to or through the central business district. In addition, elevated lines will be provided, such as the mid-city line, so that those who wish to travel between outlying points can do so quickly and conveniently without passing through the central business district.

Special assessments against benefited properties are recognized in the new ordinance. It provides that the city shall proceed to construct or acquire such subways out of new funds raised by such special assessments as the city may deem necessary and proper, or out of the city transit trust fund, or both. The ordinance states specifically that there is no obligation on the city to raise funds for financing subways by general taxation.

Among the rapid transit extensions listed in Exhibit B, the principal ones are a mid-town trunk line extending along or near Ashland Avenue from 87th Street to the Douglas Park branch; an extension on Milwaukee Avenue to Lawrence Avenue; an extension of the Humboldt Park branch from the present terminus along West North Avenue to Austin Avenue; an extension along Milwaukee Avenue to connect with the



Rapid transit service already has been extended well into the suburbs. This is the Dempster Street terminal of the Niles Center branch

Digitized by Google

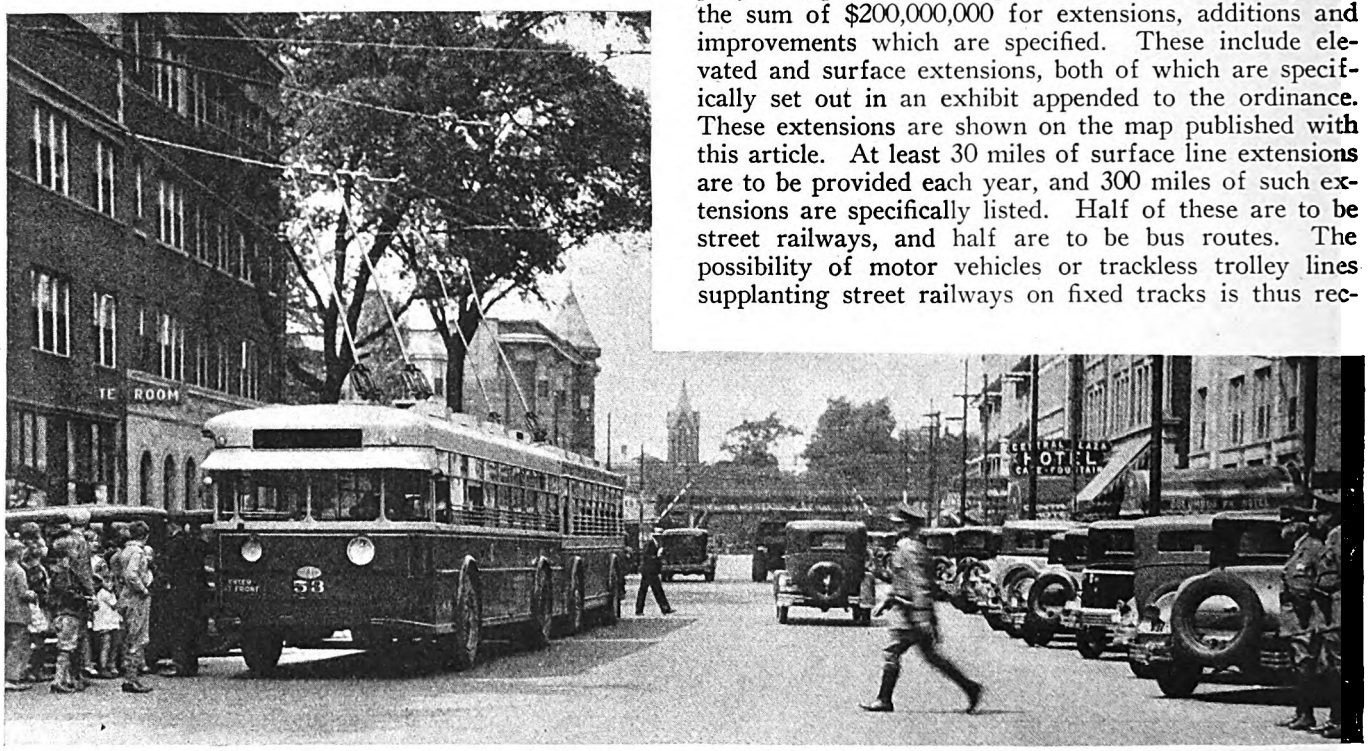
new subway; an extension from a connection with the Jackson Park branch in East 63rd Street, along the Illinois Central and the New York Central Lines to a point near the intersection of East 92nd Street and Baltimore Avenue; an extension along South Park Avenue from a connection with the Jackson Park branch in East 63rd Street, along South Park Avenue to 95th Street. The other elevated extensions are principally additional tracks on existing lines and the necessary inclines and structures to connect with city-owned subway structures.

Of the two subways, Route No. 1 will connect with the rapid transit system at a point between West Division Street and West Chicago Avenue, extending along a curve to the east, intersecting West Chicago Avenue near North Franklin Street, thence along West Chicago Avenue to North State Street, thence south along North State Street under the Chicago River to a point near East Sixteenth Street, where it will connect with the elevated structure.

Route No. 2 will connect with the elevated structure near Milwaukee Avenue, extending southeasterly along a curve to a point near West Grand Avenue and Milwaukee Avenue, thence in West Grand Avenue and under the Chicago River to a point near North Dearborn Street, thence south in North Dearborn Street under the Chicago River to a point near West Harrison Street, thence westerly along West Harrison Street under the south branch of the Chicago River to a point near Blue Island Avenue, where it will again connect with the elevated structure. This route may be changed at the option of the city by substituting West Ohio Street for West Grand Avenue, Clark Street for Dearborn Street and Polk Street for Harrison Street. Connecting subways will be provided to connect the two routes.

Not less than 1,000 additional steel or other metal cars of modern design are to be purchased for use on the rapid transit system, and not less than 1,000 additional cars or motor vehicles of modern design are to be provided for surface operation. The present rapid transit system not only will be greatly extended, but the existing plant will be improved. This will include the straightening out of the curves, the reconstruction and extension of structures, the building of new stations and platforms, the installation of escalators where needed and the elevation of the tracks of the Ravenswood branch so as to eliminate grade crossings.

General supervision of service, including extensions, additions and improvements to the new system, is vested by the statutes of Illinois in the Illinois Commerce Commission. That control will pass to the Chicago Transit Commission when such a body is created by the city. In accordance with the enabling act authorizing a terminable permit, the new ordinance requires that the company shall provide and expend, within the first ten years, the sum of $200,000,000 for extensions, additions and improvements which are specified. These include elevated and surface extensions, both of which are specifically set out in an exhibit appended to the ordinance. These extensions are shown on the map published with this article. At least 30 miles of surface line extensions are to be provided each year, and 300 miles of such extensions are specifically listed. Half of these are to be street railways, and half are to be bus routes. The possibility of motor vehicles or trackless trolley lines supplanting street railways on fixed tracks is thus recognized. Under the new ordinance the rapid transit lines in subways and on elevated structures on private right-of-way, free from the congestion of public streets, will form the essential framework of the adequate system of local transportation. The construction of the surface extensions is to proceed concurrently with the construction of the city-owned subways.



Trolley buses, the latest addition to the Chicago Surface Lines fleet, now serve 40 miles of bus lines

Removal of the elevated loop structure is not required, but the ordinance contemplates and provides for its removal in the future, whenever, by the substitution of additional subways or other facilities or the development of the transit system as a whole, the Transit Commission shall, after a hearing, find that the elevated loop structure, or any portion thereof, is no longer required by public convenience and necessity.

Provision is made for the continuance of interurban service to the center of Chicago over the rapid transit lines. The new ordinance authorizes the company to permit the use of its tracks and facilities in the subways by any company now having the right to operate over the tracks of the existing companies under operating agree-

Digitized by Google

ment. Any future agreement must be approved by the Transit Commission and must not interfere with the passenger service of the new company. Better utilization for local transportation purposes of the existing rights-of-way of steam or electric railways in Chicago and the metropolitan area have long been advocated. A section of the new ordinance expressly authorizes the new company to make operating leases or agreements for this purpose with the approval of the Transit Commission.

Detailed Provisions of the Ordinance

The ordinance as passed contains a great deal of detail and covers all of the subjects which experience has proved necessary. As published by the City Council, it comprises a 43-page folio. While it is impossible here to go into all of the details of the ordinance, the following summarization discusses the more important provisions:

Grant of Authority—The new company is granted authority to establish, construct, reconstruct, maintain and operate a comprehensive, unified local transportation system to consist of the surface lines and rapid transit systems, together with the equipment of subways, motor vehicle lines and additions and extensions thereto. The grant is to continue in force until terminated, as provided in the ordinance.

Termination of Grant—The city reserves the right to purchase the properties of the company upon six months' notice, upon the payment of a sum equal to the capital value of the transit system as fixed by the ordinance. The city also reserves the right to require the company to transfer its property to a designated permittee of the city on the same terms, except for the addition of 10 per cent if the transfer is required within the first ten years, this percentage to decrease one-tenth each year during the subsequent ten-year period. The city at any time may compel the company to comply with the terms of the ordinance through injunction, mandamus, or other appropriate proceedings in any court of competent jurisdiction.

Extensions and Improvements—In the first ten years, designated as the "initial construction period," the company is to acquire funds from the sale of securities and construct the extensions designated in Exhibit B of the ordinance. The total cost of these improvements during this period is estimated at not less than $200,000,000. During the first three years succeeding the effective date of the ordinance the company is to provide not less than $65,000,000 of this total amount for extensions and improvements. If the company fails to build the extensions, interest or dividends will not be paid either on any securities or stocks which are junior to the 3 per cent compensation paid for the use of public property, or on common stock, which, in the initial financial set-up of the bankers, represents $77,000,000 of the capital value, and this income would be applied to the building of any extensions, thus making good the default of the company. The company assumes the obligation of rendering local transportation service within the territory in all subsequent periods which the local transit commission, after hearings, shall find to be required by public convenience and necessity. It shall construct or acquire such additional extensions and additions authorized by the city and ordered by the local transit commission, after hearing.

Subways—The city agrees to construct the subways, shown in Exhibit C of the ordinance, during the initial ten-year period, the construction to be financed by special assessments levied only on properties directly benefited and from the city transit trust fund. Subsequent to the ten-year period additional subways will be built by the city in the same way. The company is obligated to equip and maintain the subways and use them as a part of the rapid transit system.

Rates of Fare—Rates of fare on the surface and elevated lines will remain the same as at present until changed by the local transit commission. Free transfers will be granted from the elevated lines to the surface lines, but a charge of 3 cents will be made for transfers from the surface lines to the elevated lines. Universal transfer privileges are provided for a continuous ride using the rapid transit lines, the surface lines or a combination, if the appropriate fare has been paid. The company is required to designate convenient and appropriate transfer points between rapid transit and surface lines, and additional transfer points may be required by the local transit commission. Employees of the company, city policemen, firemen and health department employees, when in full uniform, may ride free, and special provisions are made for letter carriers.

Paving and Clearing Away Snow—The company is required to pave the right-of-way in all paved streets occupied by its tracks, except where the city designates such an area as a parkway. All pavement on rights-of-way shall be maintained by the company. The company at its own cost must keep clear of snow the portion of the streets occupied by its tracks and provide a traffic lane on each side of its tracks, in so far as practicable. The city maintains the right to have snow, street sweepings, garbage or other street refuse transported at night on the surface lines if it so desires.

Maintenance of Property—The company is required to maintain the system in first-class operating condition. A fund representing 7 per cent of the gross receipts is to be set aside for renewal, depreciation and obsolescence. The company also is required to create a fund of 2½ per cent of its gross receipts as a damage reserve fund. The local transit commission may enter orders from time to time increasing or decreasing the per cent appropriated so that funds may be adequate to meet the needs.

Compensation to the City—The company will pay into the city transit trust fund 3 per cent of its annual gross receipts as compensation for the use of public property. For the administration of this fund the Mayor will appoint a Chicago, state or national bank or trust company, with a capital stock and surplus of at least $2,000,000, as trustee. The present city traction fund will be transferred to this new city transit trust fund within 30 days after the ordinance becomes effective.

Use of City Transit Trust Fund—Money from the fund may be used for the following purposes:

1. To pay the salaries of the Chicago Transit Commission.
2. Compensation of the trustee.
3. The sums authorized by the City Council to meet the cost of the construction of subways provided in Section 9.
4. The sums authorized by the City Council "to pay expenses of the city in connection with the protection of the rights of the city or the enforcement of the company's duties and obligations under this ordinance."
5. Sums required for the cost of renewal or replacement of any destroyed portions of the subway.
6. The cost of the city's share of relocating company's tracks, as ordered by the transit commission.
7. The cost of any additional subways, and the sums required to complete the final purchase of the property of the company.

Employee Pensions—The company must establish and maintain a pension system upon such terms as the company and its employees may agree, subject to the approval of the local transit commission. Reasonable life and health insurance for employees also must be provided out of the operating expenses of the system.

Value of Properties—The value of the properties of the surface lines and rapid transit company as of Aug. 31, 1929, is agreed to be $260,442,063.82, "to which may be added such amount as the Illinois Commerce Commission may approve to meet the working capital requirements of the company." It is agreed that this sum will be augmented by additions to capital value and from it will be subtracted deductions in capital value, made between Aug. 31, 1929, and the effective date of the ordinance, and the total thus obtained shall be the initial capital value. Subsequent additions to the initial capital value must be approved by the local transit commission, and this initial capital value, plus all additions and less all deductions or reductions of capital value, shall constitute the true capital value of the company's property, which will be taken as the actual net investment of the company in determining the basis for fixing rates of fare and return to the company. Additions to the capital account are confined to actual expenditures for new additions.

Return to the Company—It is agreed that the company is entitled to, and shall receive, a just and reasonable return, to be fixed from time to time by order of the local transit commission. If the corporate income of the company in any fiscal year is in excess of the return so fixed, the excess will be paid into the city transit trust fund as additional compensation to the city.

Approval of the Ordinance—The ordinance will not be in full force unless:

1. It be approved at the referendum vote on July 1, 1930.
2. The Illinois Commerce Commission authorizes the purchase of the properties and the issuance of securities as provided in the ordinance.
3. The company accepts within 120 days after the referendum.

There are four exhibits which are part of the ordinance. Exhibit A lists the properties of the surface and rapid transit lines now owned which are to be acquired by the new company. Exhibit B lists the extensions and additions provided for the initial ten-year period. These are shown in the map published with this article. Exhibit C provides the routes of the proposed subway structures. Exhibit D lists the bonds of the Chicago Rapid Transit Company which will continue as liens until maturity.

Digitized by Google

C.E.R.A. Analyzes Condition of the Industry

IN VIEW of the serious decline in riding and revenue accompanying the present business depression, the Central Electric Railway Association, which convened at Cedar Point, Ohio, on July 17 and 18, devoted a major part of its program to a discussion and analysis of the situation. It was the general opinion of the body that although the depression had caused great losses to all transportation companies and an immediate upturn could not be expected, the economy measures instituted and service adjustments made to offset these declines would yield increasing and continuing benefits to the railways with a return to normalcy. The trolley bus, taxation and modern braking were other subjects presented.

The meetings were conducted under the chairmanship of the association president, L. G. Tighe. In his opening address Mr. Tighe commented on the present condition of the industry and summarized the replies to a letter sent to several member companies to gain a cross-section of the industry's status. With the exception of two, all the companies reported serious falling off in passenger and freight revenue and unfavorable industrial conditions in their territories. The replies revealed, however, the many steps being taken to hold up the net. Increasing speed, improving equipment, rearranging routes, eliminating stops, abandoning unprofitable lines, adjusting fare schedules, affecting all economies possible, merchandising rides, giving pick-up and delivery freight service and making the service generally more attractive are some of the activities Mr. Tighe reported.

"Look beyond the present" was the counsel of G. C. Hecker, general secretary American Electric Railway Association, in his address on the general situation of the industry and the San Francisco convention high spots. In spite of all the adverse figures, he related, optimism prevailed at the Coast meeting. This was prompted by the general feeling that an upturn would be witnessed in the fall, and by the progressive moves being made to develop new cars, secure adequate fares and meet the competition of the private automobile. Mr. Hecker told of the Presidents' Conference plan, announced at the convention, the purpose of the organization and its plan of attacking the problem. He stated that progress necessarily would be slow and added that companies should not defer car purchases.

Another encouraging factor, the speaker pointed out, is the rapid approach of the private automobile to its saturation point. Leaders of the automotive industry expect a stabilization in the manufacture of their product very soon, a condition which will have a vital influence on the electric railway riding habit. In the meantime, Mr. Hecker added, the railways should give the most in speed, comfort and convenience to approach automotive service.

The speaker commented on the wide variation in maintenance costs, the opportunities for interchange of ideas and the adoption of new practices, the problems facing the small cities and the development of freight business.

The convention was addressed next by W. J. Clardy, Westinghouse Electric & Manufacturing Company, who spoke on the trolley bus. "A new form of successful transportation without rails," he stated, "has been introduced by the modern trolley bus. This vehicle is permitting the economic expansion of the field of street railway business and is a much-needed tool for increasing transportation revenues. It offers a means of providing service in smaller cities or extending into new territory in larger cities, with a reasonable investment and low operating cost. The outstanding factor in favor of the trolley bus is that its application has resulted in increased gross receipts. It appeals to both the public and operating men."

The subject was discussed also by C. A. Burleson, General Electric Company; L. M. Zapp, Eastern Michigan Railways; G. C. Hecker, A.E.R.A.; R. N. Graham, Penn-Ohio System, and Ross Schram, Twin Coach Corporation.

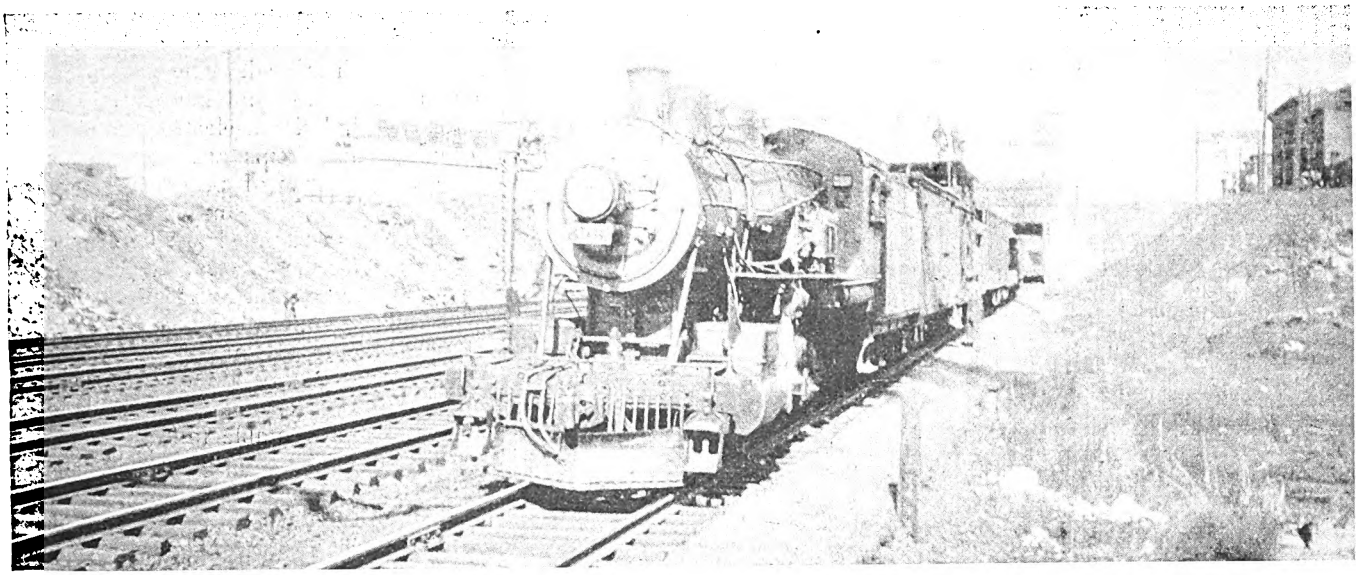
"Transportation and the Finest Motive in the World," was the subject of an address at the second session by Allan Rogers, supervisor public relations New York Central Lines. Mr. Rogers commented on the essentiality of the industry and stated that the public really is interested in transportation. Enthusiasm, according to the speaker, is the greatest need of both the steam railroads and electric railways to forge ahead. "Have faith in your industry and confidence in yourself," was the counsel added. Mr. Rogers urged the development of new business and spoke at some length on "taxation without due compensation."

Following Mr. Rogers' address a paper was presented by G. L. Cotter, engineer Westinghouse Traction Brake Company, on "Modern Braking of Electric Railway Cars." "Traffic density during the past few years," Mr. Cotter stated, "has seriously affected average schedule speeds of street railway cars. Inability to start and stop as quickly as other vehicles has caused a slowing down to permit safe operation. This can be remedied, however, by improving the car brakes. The more nearly the street car approaches the stopping ability of the automobile, the better it is prepared to hold its place in the traffic stream. By modernizing the brake equipment the stopping distance can be decreased 40 to 50 per cent.

"Since there are thousands of old cars in service, a great improvement in average braking performance on any railway can be obtained by modernizing the equipment. This involves, first, the reduction of time of application and release from the three to five second rate to the recent standard of one second or less, and second, bringing the braking force nearer the point of wheel sliding than has been the practice."

The convention was concluded with an interesting symposium on "What's Ahead for the Industry." Those who participated were: Charles H. Jones, Chicago, South Shore & South Bend Railroad; R. R. Smith, Northern Indiana Railways, Inc.; H. A. Nicholl, Union Traction Company of Indiana; L. M. Brown, Interstate Public Service Company; R. N. Graham, Penn-Ohio System; Claude L. Van Auken, *Electric Traction*; Clifford A. Faust, ELECTRIC RAILWAY JOURNAL; L. M. Zapp, Eastern Michigan Railways; T. A. Ferneding, Dayton-Xenia Railway; W. S. Rodger, Eastern Michigan Railways; G. C. Hecker, A.E.R.A.; W. H. Beattys, Westinghouse Electric & Manufacturing Company; James H. Drew, Ohio Brass Company, and R. H. Palmer, Westinghouse Electric & Manufacturing Company.

Digitized by Google



Maintenance train used on the overhead system of the New Haven's main line

Maintaining the DISTRIBUTION SYSTEM *of an Electrified Railroad*

By B. F. BARDO

Superintendent of Electric Transmission, New York, New Haven & Hartford Railroad

Reliability is considered of the greatest importance on the New Haven Railroad's electrified division. Particular precautions are taken to eliminate defects in the power distribution system before they may cause interruptions to train service

RELIABILITY that is required in railroad service is of such a high degree that everything must be done to put the distribution plant of an electrified system in the best shape possible and to keep it so. Electric motive power is helpless without a supply of energy.

The electrification of the New Haven Railroad, while not the largest in this country from the standpoint of route-miles, is perhaps the most comprehensive one in the United States at the present time. In round numbers, the company owns 583 miles of electrified track, distributed as shown in Table I. The location of lines and the dates of electrification are given in one of the accompanying diagrams.

The contact and feeder wires have a voltage of 22,000 between them, with 11,000 volts from each to the rail return. As a rule, both the feeder and contact wires are supported from the same structures, which are of steel and spaced a nominal distance of 300 ft. apart. On all except the New Canaan and Danbury branches the feeder system is in duplicate, two No. 0000 wires being on each side of the right-of-way.

Power for signals is carried on duplicate single-phase, two-wire No. 00 circuits. Most of these operate at 11,000 volts, although those west of New Rochelle and on the New Canaan branch carry 2,300 volts. Duplicate single-phase one-wire No. 00 circuits at 11,000 volts carry power for circuit breaker control between Harlem River, Woodlawn and New Haven. Between South Norwalk and New Rochelle there are also two three-phase, three-wire 11,000-volt No. 0000 circuits, and between New Rochelle and Oak Point similar circuits, but of No. 00 wire. Throughout the electrified territory low-voltage multiple conductor signal cables are suspended by steel messengers from the main supporting

Table I—Mileage of New Haven Railroad with Electrified Contact System

	Route-Miles	Track-Miles
Main line, four track	62	248
Branch line, six track	12	72
Branch line, four track	4	16
Branch line, two track	5	10
Branch line, single track	42	42
Yards (track miles)	195	195

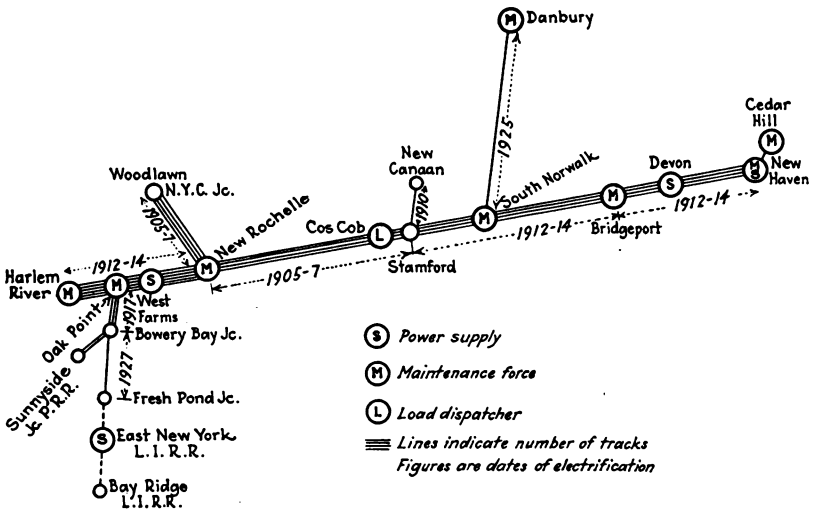
Digitized by Google

Table II—Classification of Feeder System on New Haven Electrified Section

	Miles
Four traction feeders, single phase, one wire	81
One traction feeder, single phase, one wire	24
Two power feeders, three phase, three wire	69
Two signal feeders, single phase, two wire	66
One signal feeder, single phase, two wire	12
One signal power cable, two and four wire	12
Two control feeders, single phase, one wire	75

structures. The different types of circuits and mileages are shown in Table II.

Contact and feeder systems are sectionalized at 26 points, most of which are interlocking signal stations. More than 700 oil circuit breakers are involved, all remotely controlled and practically all automatic. There are about the same number of disconnecting switches. All of the oil breakers and about half of the disconnecting switches are under the control of the load dispatchers.



Schematic diagram of the New Haven's electrified system, showing locations of power supply, maintenance forces and load dispatchers

Power Generated and Also Purchased

The principal source of power is the company's steam station at Cos Cob, Conn. Supplementary supplies are obtained from the United Electric Light & Power Company through a joint substation at West Farms, N. Y., and the Connecticut Light & Power Company at Devon, Conn. Emergency connections of limited capacity are maintained to the Connecticut Company at New Haven and the Long Island Railroad at East New York.

The normal daily traffic includes 264 passenger trains on both main and branch lines, and an average of about 37 freight trains. In addition there are the usual work trains and light engine movements. All yards, both freight and passenger, west of Stamford are operated entirely by electric switchers. East of Stamford both steam and electric switching is employed.

Operation, maintenance and construction of the entire distribution system are handled by an organization which is shown in detail in the accompanying chart. Besides the general officers, two general foremen are in charge of all maintenance and construction in the territory east and west of Stamford respectively. The chief load dispatcher and his assistants are located at Cos Cob.

Each fall a close-up inspection of the entire catenary and contact system is made. Each spring a similar inspection is made at interlocking plants and also where the service is known to be sereve. Trains are used from the tops of which the inspection is made. The various items requiring attention are recorded and later are used to form a work list for each individual electric section.

The indicated maintenance items are done in order of their importance with a view of preventing a plant failure. If maintenance items of a similar nature occur in any quantity they are programmed and the material prepared in advance. Sometimes special facilities must be employed to be sure to get the work done before difficulties arise. It is far simpler to schedule, say, a 30-minute maintenance job in the middle of relatively dense service than to run the risk of a plant failure at an unknown time with repairs which may take hours. As a result there are but few preventable failures.

Each summer a survey is made of the entire electric zone to determine the height of the contact wire above the rail under each overhead highway bridge. All locations lower than 16 ft. are inspected to ascertain what must be done to increase the clearance to that value. The distance from contact wire to rail tends to decrease due to several causes, the more important of which are: (1) Slack catenary messengers or trolley or overlong hangers; (2) raising the rail more or less unconsciously during track tamping; (3) replacing rail and tie plates with new material of greater over-all height.

The results of the clearance survey are kept for reference when a question is raised as to the possibility of moving an over-dimension car. A published permissible height for cars may be 15 ft. 7 in., based on a nominal limiting clearance between contact wire and rail of 16 ft. Over-dimension cars may be routed from one track to another, or even handled under dead wire if that appears better than reloading.

Besides general annual inspections there are intermediate schedule inspections of special parts.

During the five-year period 1925-1929 the time of our maintenance trains was distributed as shown in Table III. Ordinarily these trains are manned by one foreman and three linemen. We have tried to make the train equipment as complete as possible: The trains have been designed for speed in doing the work, because that actually makes the time more productive. They operate both day and night and are electrically lighted, the equipment including floodlights and one portable 6-volt storage battery lamp. The elevating platform of the tower car is operated by a compressed air motor. Compressed air is also used for operating wrenches and for drilling. Each train is equipped with a forge, drill press, rod shear, automatic die heads for threading rods up to ½ in., and other small tools. Oxyacetylene cutting and weld-

Table III—Distribution of Time of Maintenance Trains on New Haven Electrified System, in Hours

	1925	1926	1927	1928	1929
Total time	14,720	17,374	17,497	17,778	15,573
Delay for causes beyond control*	6,471	8,119	7,378	6,654	6,531
Traveling	3,183	3,372	3,414	3,847	3,296
Time on maintenance work	4,488	4,868	5,373	5,575	3,399
Time on construction work	578	1,015	1,332	1,702	2,347
Total work	5,066	5,883	6,705	7,277	5,746

*Includes transportation delay, waiting for engine on cars and time held in yards or sidings clearing superior trains.

Digitized by Google

ing equipment is carried. We also are experimenting with a compressed air operated pay-out and pick-up reel holding about 5,000 ft. of two-conductor, rubber-insulated cable, by means of which our train can keep in touch by telephone with the load dispatcher.

In the yards and on the branch lines the basis of maintenance effort is the periodic inspection. In the four major yards the personnel consists of an emergency foreman with a lineman and a helper on the day trick, supplemented by an electric switch operator on each of the other two tricks. The Danbury branch has a crew similar to that used in yards on the day trick. At the Oak Point and Cedar Hill yards and on the Danbury branch a gas rail-and-tower car combination, as shown in one of the illustrations is used. This equipment covers the ground readily and provides a well-equipped point from which to work.

Substation or anchor bridge maintenance includes all inspection and repair work on breakers, disconnecting switches, transformers, control cables, switchboards and other equipment at sectionalizing points. In the inspections every attempt is made to ferret out faulty conditions before failures occur. Oil circuit breakers are inspected internally after closing once on a short circuit, or after opening six times under short circuit conditions. Exceptions are the circuit breakers on stub-end circuits, which are inspected after each operation under short circuit conditions. An individual card for each piece of major substation equipment carries a brief record of the inspection and maintenance of that piece.

Insulating oil in large transformers is sampled every six months. If the average of three samples from the bottom of any tank fails to exceed the minimum breakdown limit, two to four barrels are drawn off from the bottom, a like amount of new oil added, and another test made. Every two years the oil is filtered by a portable centrifuge. Circuit-breaker oil is changed every two years unless more frequent replacement is necessary on account of operating developments. The bus supporting and other pin and suspension insulators at all anchor bridges are tested annually by a standard device, and defective ones scheduled for replacement. Operation of all relays is checked twice yearly.

Safety Methods Are Stressed

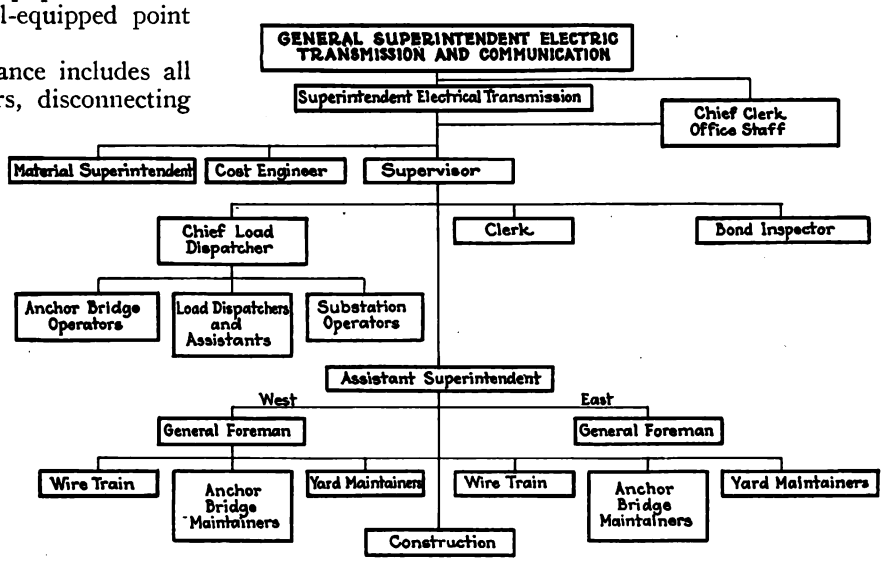
Safety of employees is given considerable attention. No work is done on wires of the traction distribution system until they are de-energized and grounded, usually at two or more points. Each employee must pass an examination on the more important of the safety rules. In addition safety officers must qualify on certain fundamental rules of the operating department.

Practices known to be safe are developed in detail and the forces are instructed in their use. Cards are used for reporting practices or conditions which are considered unsafe. These are referred for correction to the department involved, and are made the subject of comment at the regular monthly safety committee meeting, of which the general superintendent of electric transmission and communication is chairman and most of the supervising officials are members. In addition, all accidents are analyzed.

Besides these meetings, other monthly meetings, lasting about one hour, are held by field forces. At these meetings safety rules, accident analyses and first-aid work are handled. Since 1928 a course in first aid has been available. A number of the department employees hold Red Cross certificates.

Method of System Operation Standardized

Operation of the distribution system, which handles about 200,000,000 kw.-hr. per year, differs from that of a power company principally in that the system is broken up into very much smaller parts. The chief load dispatcher at Cos Cob is assisted by four load dispatchers and two assistant load dispatchers covering the 24-hour



The organization of the electric transmission department of the New Haven Railroad

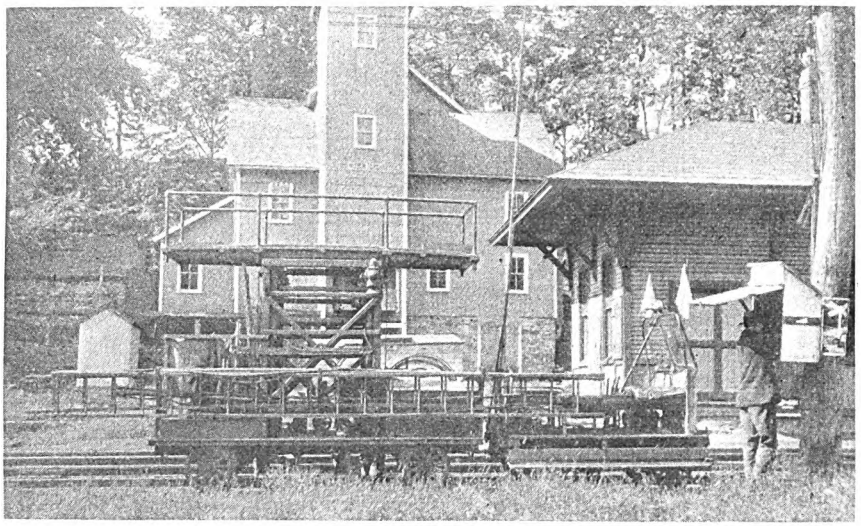
period. The two principal duties of the load dispatchers are: (1) Isolation of faults, and (2) procuring track, feeder or other circuits for maintenance and construction forces in co-operation with operating department officials.

In the isolation of faults the load dispatchers are assisted principally by reports from signal station operators, who control all sectionalizing breakers. A fault or ground is cleared by the automatic opening of circuit breakers at adjacent signal stations. The operators report immediately by selector type telephone to the load dispatcher, who proceeds to energize those circuits which do not appear to be directly involved. In general, it is the practice to close main line and yard traction circuit breakers directly on the fault, but this is usually done immediately and only once. Faulty traction circuits are left de-energized if reports to the load dispatcher disclose clearly the nature of the trouble. Faulty feeder circuits usually are left open until after an inspection to locate the difficutly. Fautly traction circuits on the single-track New Canaan and Danbury branches normally are tested once. If they do not show clear they are left de-energized until a member of a train crew reports. The load dispatcher instructs the crews to drop the pantographs, after which the circuit is tested again. If the branch then shows clear, the inference is that there was difficulty with the locomotive and the crew is informed accordingly. If no trains are on such single-track branches additional tests may be made at the option of the load dispatcher, but an inspection is always ordered as soon as possible.

Maintenance and construction forces inform the load

Digitized by Google

dispatcher as to the extent of the circuits or equipment they require, and for how long. When traction circuits are involved the load dispatcher consults the train dispatcher. After mutual agreement has been reached the load dispatcher has the necessary circuits de-energized and so informs the foreman or assistant foreman of the gang involved. The foreman enters the time and the description of the circuit or circuits in his log book and has them grounded for protection. He gives each man who is to work on or near them a copy of the log or clearance slip. When the work is finished the log slips are taken back, the protective grounds removed, and the circuit or circuits turned back to the load dispatcher.



In the yards and on the branch lines gas rail tower cars are used

When employees of other departments or outside contractors have much work to do for which circuits of one kind or another must be de-energized and grounded, an employee familiar with the system is assigned to prescribe safe working space and to procure and ground such circuits as may be necessary.

Besides their principal duties load dispatchers have several others. All remote controlled circuit breakers are daily put through a complete cycle of operation, usually during the early part of the second trick. If any circuit breakers misbehave, repairmen are then available to fix them. On days of special traffic, such as football days or those preceding holidays, this test is omitted. Once every 24 hours the load dispatcher requests each signal station operator to inspect his switchboard and report all open circuit breakers. This check catches any breakers which are open or closed incorrectly.

Interference with radio reception is a source of little difficulty with us, although any arcing contacts usually will affect nearby reception. Fuses, disconnecting switches, poorly fitted catenary hardware and devices for feeding the draw span of bridges cause practically all of the difficulty. A small radio head set in the load dispatcher's tower is used to indicate trouble. A portable test receiver is used by the bond inspector to locate difficulties not readily apparent. A complete record is kept of every radio reception complaint investigated.

Firemen who are fighting fires contiguous to, or on, the right-of-way must be protected. The fire departments of all communities served by the electrified section have been informed on whom to call if the fire requires de-energizing of wires. In the event of a call of this kind it may be necessary to de-energize all wires by the scene of the fire for a short period. Responsible officers of the operating or distribution departments are hurried to the scene of the fire to take steps for restoring normal service.

To assist in clearing up after wrecks or other emergencies, a car of wood poles and a framed wood bent is kept available at New Rochelle. At Bridgeport and New Rochelle two circuit breakers are held completely assembled ready for immediate use. There is also a section of control switchboard with the usual equipment ready for wiring, and operating circuit breakers. A spare 2,000-kva. balancing transformer is kept on a special car at New Rochelle, with equipment for installing it quickly. Spare small transformers and other equipment are available at both New Rochelle and Bridgeport.

The total number of grounds and preventable defects for the latest five-year period available is given in Table IV. This table sets forth grounds as differentiated from faults. For instance, an insulator, particularly of the wood strain type, may flash over a number of times before definitely failing. There is only one fault but a number of grounds. Every fault is investigated so that it may be properly classified as between preventable and otherwise, and that so far as possible steps may be taken to prevent a recurrence.

Table IV—Total Number of Grounds and Preventable Defects on New Haven Electrified System, 1925–1929

Cause	1925	1926	1927	1928	1929
Distribution system.....	502	425	322	248	209
Other known causes.....	1,358	1,361	1,312	1,032	830
Unknown and unclassified....	568	743	600	488	371
Total.....	2,428	2,529	2,234	1,768	1,410
Preventable defects....	Not recorded	201	166	108	89

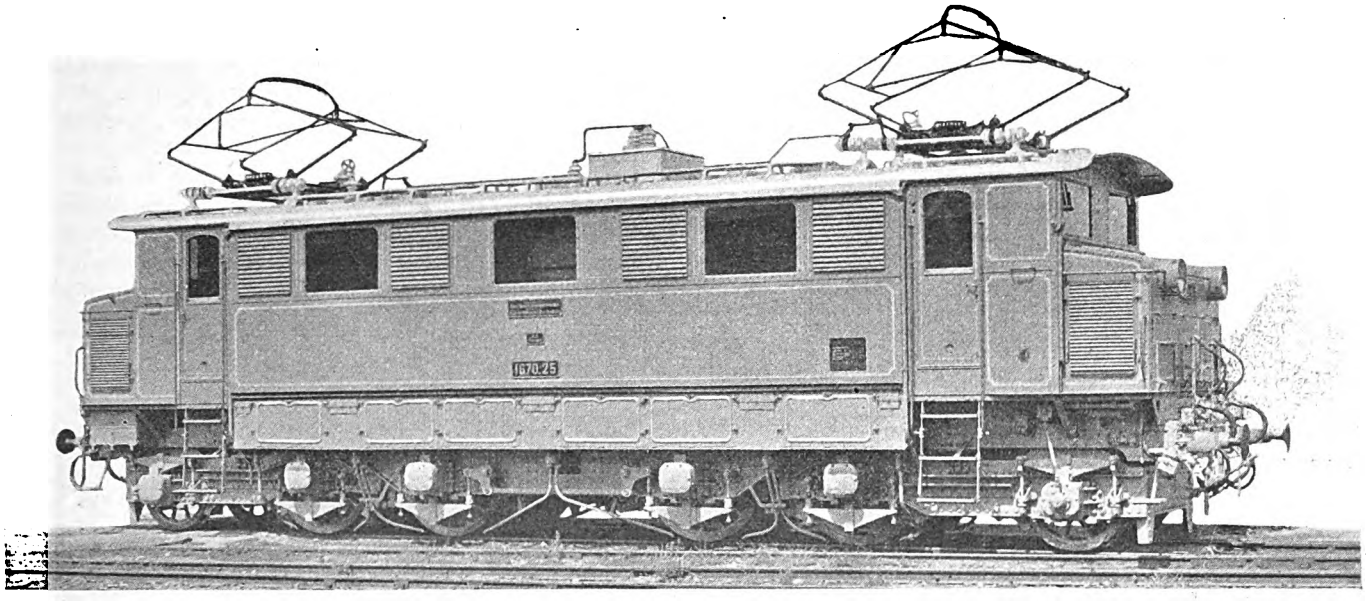
Commercial Frequency for Single-Phase Road

EXPERIMENTS are being made in Germany with single-phase current of commercial frequency for railway service. Two locomotives have been built and are being tried on an industrial railroad, according to *Elektrotechnische Zeitschrift*. The locomotives are capable of starting a train of 1,400 tons 60 times an hour in either direction, with control no more difficult to operate than that of a direct-current locomotive.

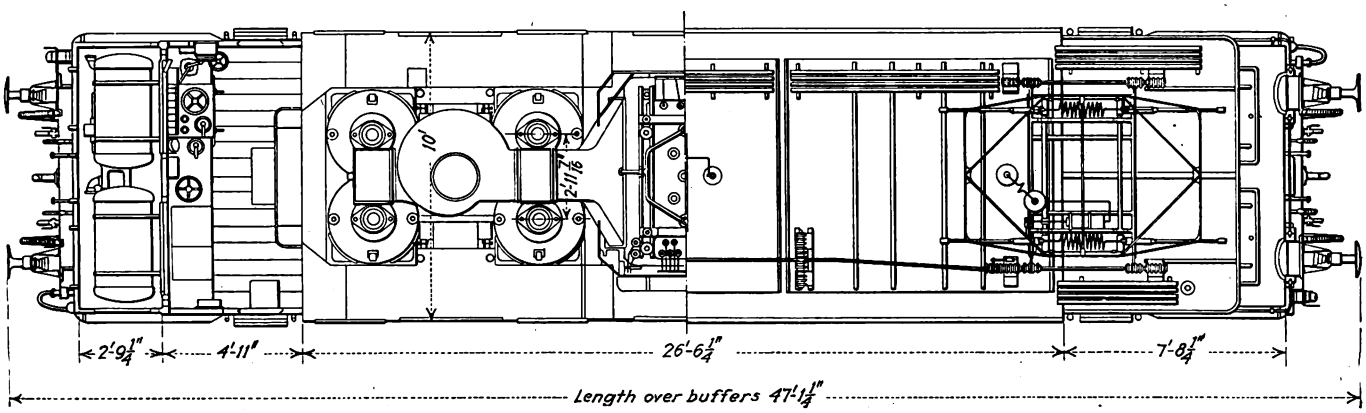
The power is developed from single-phase compensated motors in conjunction with three-phase motors. On the first control step the single-phase motor is connected in cascade with a three-phase motor of the same number of poles. For reversing, advantage is taken of the characteristic of the induction motor whereby it turns in the direction of the rotating field when fed through the stator and opposed when fed through the rotor.

For starting, the converter is started first to supply direct-current for excitation of an intermediate rotor. When this attains synchronism the locomotive is ready to start. The control is actuated with direct current converted on the locomotive

Digitized by Google



One of the new Austrian Federal Railways locomotives with vertical twin motors



The twin motors drive individual axles. As they are within the cab they are readily accessible

Vertical Motors Feature Austrian Locomotives

Built for high-speed passenger service, twin motors drive individual axles through bevel gears

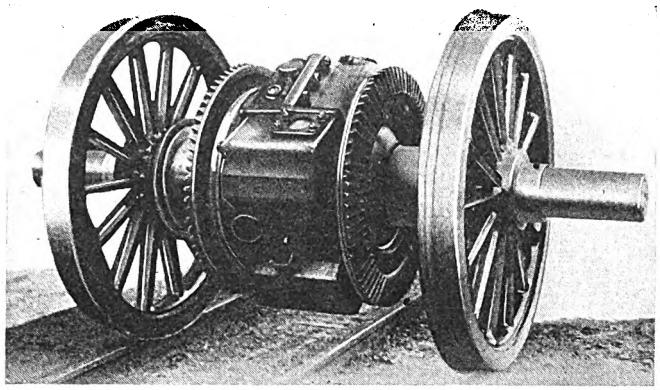
LOCOMOTIVE drive of a type differing radically from that in use in America has been found successful on the lines of the Austrian Federal Railways. The principal feature is the use of vertical motors connected to the driving axles through bevel gears. The drive is somewhat similar to that brought out a short time previously by the Midi Railway of France.

At first, the Austrian Federal Railways bought four locomotives of the vertical type. These had four driving axles, with a motor mounted above each. The satisfactory performance prompted the railway to adopt a similar design for use in high-speed passenger service on the Innsbruck-Salzburg division of the main line. This section has grades up to 2.5 per cent and curves with a minimum radius of 225 meters (75 ft.), over which trains of 360 tons are hauled at speeds of about 70 km. (42 miles) per hour. Since it was desired to run the trains through without change of motive power and to attain the highest schedule possible, it was deemed advisable to increase the rating.

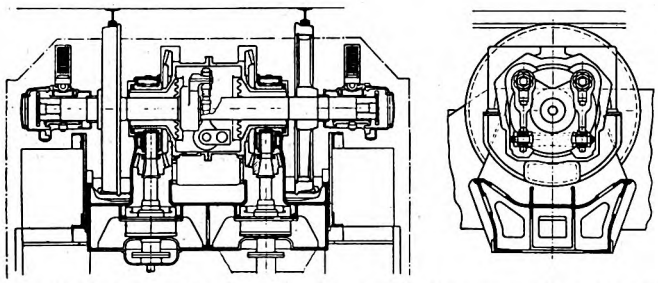
Both types of locomotives have the same general arrangement of parts. The new type, of which 29 are now in service, differs from the earlier design principally in having twin motors geared to each axle. Each axle carries a quill which is flexibly mounted through links. At each end is a bevel gear, held in a fixed position with respect to the motor and the locomotive frame. The driving mechanism is completely housed in a drum-shaped casing.

The flexible links between quill and axle are carried inside the drum. Two guiding rods are linked on one side to two arms on a short shaft carried in bearings within the drum, the other ends of the rods being connected to two crankpins mounted on arms projecting

Digitized by Google



Assembly of a driving axle showing the inclosed flexible links and the twin bevel gears



Detail of the flexible drive. The double-link connection permits of considerable motion between wheels and body of the locomotive

from the driving axle. Ball joints at either end of the rods provide full flexibility in every direction between the driving wheels and the spring-supported unit of body, motors and quills.

The bevel gears are of the helical type, and are said to be extremely smooth and quiet in action. There is a twin-step bearing on each motor shaft to absorb the vertical thrust.

Location of the motors within the cab makes the commutators and brushes accessible even when the locomotive is in motion. The high center of gravity gives good riding qualities at high speeds. The available lateral play of the drivers permits the use of a leading truck at either end of the locomotive, with one idle axle and one driving axle. With the low unsprung weight and small-diameter wheels, the wheelbase was made short, and easy guiding over the sharp curves on the mountain division was made possible.

The principal reason for the change from the single motor to the twin motor design was the need for an increased output. The twin motors weigh only slightly more than a single motor. Due to the smaller armature diameter, the rotating masses are smaller and the inertia effect is reduced, making acceleration and retardation easier. The gyratory effect in each group is compensated by having the motors equally spaced about the center line.

The motors are connected permanently in series. It has been suggested that the same locomotive design can be adopted for freight service with the motors connected for half speed, although this has not been done as yet.

Following are the specifications of the locomotives:

Specifications of High-Speed Locomotives of Austrian Federal Railway

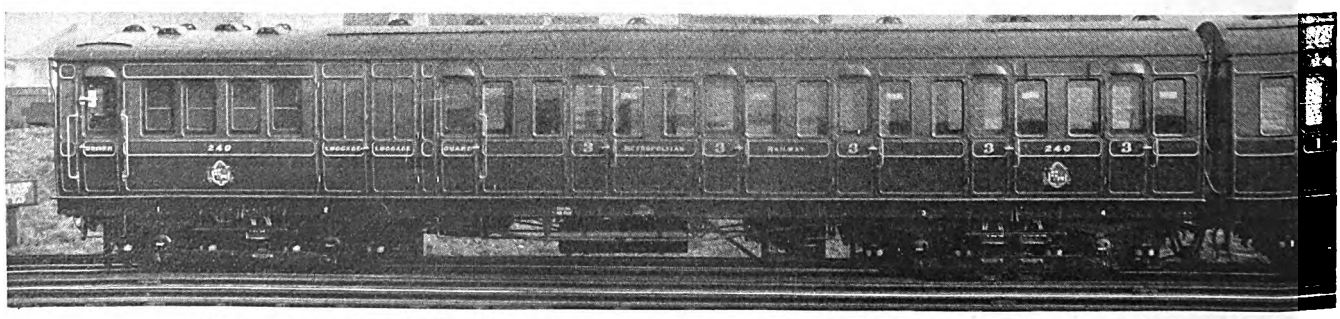
Electric system	Series 1570 Single-phase, 15,000 volts, 16⅔ cycles	Series 1670
Number of units	4	29
Diameter of drivers, in.	53½	53½
Wheelbase, ft.-in.	36–2	36–2
Length between buffers, ft.-in.	46–0	47–2
Number of motors	4	8
Motor voltage	385	385
Gear ratio	1:3.82	1:3.82
Continuous transformer output, kva.	1,550	2,840
Continuous locomotive output, kw.	1,270	2,200
One-hour locomotive output, kw.	1,650	2,440
Speed at continuous rating, m.p.h.	41	45
Speed at one-hour rating, m.p.h.	35	41
Maximum safe speed, m.p.h.	53	67
Tractive effort at starting, lb.	37,500	42,000
Weight, mechanical equipment, tons.	57.2	56.7
Weight, electrical equipment, tons	44.0	49.0
Weight total, tons	101.2	105.7

British Subway Tries Roller Bearings

ROLLER bearings on electric cars have just been put into service by the Metropolitan Railway, of London. This is the first use of bearings of this type on electric trains in the United Kingdom. If they prove satisfactory, as seems likely, they are to become standard equipment on this subway.

The roller-bearing axle boxes and motors of these trains are the result of intensive research, and constitute a radical departure from conventional design. They give promise of substantial economies, together with greater mechanical efficiency, smoother running and quicker acceleration. Attention to lubrication is said to be necessary only about once a year. The reduction in train resistance will, it is hoped, lower the demand for electrical energy on starting, give increased speed without involving the risk of hot bearings, and also permit the introduction of heavier trains.

It is not without interest that the company is returning to the compartment type of coach, which it now regards as affording the speediest method of discharging and loading passengers.



Compartment type coach of Metropolitan Railway of London equipped with roller bearings

Digitized by Google

Bonus Plan Works Well

on New York & Queens County Railway

Receipts have been increased, accidents have been reduced and employment has been stabilized since employees have shared in earnings

BONUSES for certain classes of employees, based upon earnings, have contributed measurably toward the successful operation of the New York & Queens County Railway during the past seven years. When Gen. Lincoln C. Andrews assumed control of the property, in 1923, the receipts of the company were the lowest per car-mile of any of the street railways in the New York metropolitan area, averaging just over 29 cents. Setting a quota of 31 cents per car-mile, the management agreed that for every cent per mile which the property should earn above this figure, certain of the employees should have their base rate of pay increased 1 cent per hour. Those participating include all platform men and supervisors, all employees of the shops and mechanical department excepting the superintendents, all employees of the line department, and all substation employees. Trackmen are not included because the track force is a seasonal one and few of the men employed in this capacity remain with the company for more than a few months at a time.

To be eligible, an employee of the transportation department must work at least 150 hours each month. In order to stimulate interest in safety and to reduce accident expenditures, it has been further provided that trainmen involved in accidents for which they are at fault shall lose their bonus for the month. Shop employees responsible for poor maintenance resulting in pull-ins, etc., may also be penalized in this way at the discretion of the management.

From the very inception of the plan receipts began to exceed the figure of 31 cents per car-mile, making the bonus plan operative at once, and this continued with only one break until August, 1924. During the latter part of 1924 and the first half of 1925 receipts fell below the quota figure and no bonus was paid. When the company sought, and obtained, an increase in fare from 5 cents to 6 cents, effective in July, 1924, the basis of the bonus was raised to 37 cents per car-mile. Receipts have run above this figure continuously for the last 52 months, reaching a maximum of 46.75 cents per mile, as shown in the accompanying table.

When the Interborough Rapid Transit subway was extended to Flushing in 1928, it was thought that the receipts of the New York & Queens County Railway would suffer a severe decline, but the rapid development of the community has prevented this. Certain unprofitable lines were abandoned and service on others was reduced, with the result that neither receipts per car-mile nor the gross receipts of the company have suffered to any extent.

Under the original plan, the money earned in the form of a bonus was made available and was included in each payroll, being based upon the earnings of the previous month. Effective Jan. 1, 1929, however, the plan was altered so as to permit men to leave the bonus on deposit in a savings bank to be paid in a lump sum, plus 4½ per cent interest, at the end of the year. It was also provided that those choosing to do so could have the bonus paid monthly as had previously been the practice.

Monthly Bonus Payments, in Cents per Car-Mile, by New York & Queens County Railway

	1923	1924	1925	1926	1927	1928	1929	1930
January	.....	0.013	.....	.....	0.0450	0.0425	0.0375	0.0425
February	.....	.008	.....	.....	.0400	.0375	.0350	0.450
March	.....	.....	.....	0.007	.0370	.0475	.0525	.0375
April	.....	.016	.....	.011	.0500	.0500	.0625	.0500
May	.....	.025	.....	.026	.0690	.0625	.0675	.0675
June	.....	.046	0.012	.054	.0740	.0975	.0525	.0575
July	.....	.036	.006	.047	.0310	.0800	.0325	
August	0.014	.008	.008	.023	.0375	.0650	.0225	
September	.015	.....	.034	.030	.0450	.0525	.0500	
October	.018	.007	.050	.050	.0800	.0850	.0500	
November	.008	.....	.027	.029	.0575	.0475	.0475	
December	.006	.....	.....	.047	.0400	.0375	.0500	

Two weeks before Christmas, 1929, a general distribution was made of the bonuses which had accumulated during the year. The total amount distributed in this manner was approximately $9,000. Through the monthly payrolls an amount even greater had been distributed, the total bonus payments for the year aggregating $21,531. The amount of the individual bonuses varied, the highest three awarded being respectively $184, $177 and $174.

Every day the receipts per car-mile of the previous day are posted in the trainmen's quarters at the carhouse. The cumulative earnings of the month are also published, so that the men can determine very closely, from day to day, just what the month's bonus is going to be. The entire force takes a lively interest in this and follows the company's fortunes closely.

Edward A. Roberts, general manager of the property, is convinced that the men are making a real effort to increase the company's business, and that their efforts along this line are largely responsible for the success that has been attained. He is also convinced that the accident clause in the agreement with the men has had a salutary effect. In order to clear themselves of responsibility, the trainmen are provided with "my own fault" cards, upon which they secure, if possible, the signatures of drivers or others with whom they become involved in accidents. This practice has proved effective in reducing damage settlements, the expense of which, during the past year, totaled less than 1 per cent of the gross receipts. Since the bonus plan was inaugurated there have been no labor troubles of any description, and the management believes that the plan has had the effect of stabilizing employment, particularly among the older trainmen and shop employees.

Digitized by Google

Employee PENSION PLANS

Survey covering 27 electric railways shows unanimous agreement concerning desirability of pensions. In almost all instances entire cost is carried by company, and difficulties are anticipated as number of eligibles increases.

PENSIONS for veteran employees and methods of financing such an arrangement have been receiving more and more attention from electric railway executives during recent years. On some properties pension plans have been in effect for more than twenty years, and on a considerable number they have been in effect for ten or fifteen years. Recently has come the discovery that the payment of benefits is exceeding the early estimates, and the annual appropriations for pension purposes are assuming considerable proportions. It appears likely that this problem will become more serious as time goes on. For the purpose of determining the facts of the situation, and to secure the opinions of executives of companies where pension plans are in effect, ELECTRIC RAILWAY JOURNAL has made a survey covering more than a score of such properties in the United States and Canada.

Considerable similarity in the experience of the various companies was disclosed by the survey. Without exception the executives expressed the opinion that a pension plan of some kind is desirable. At present very few of the railways have established any reserve to meet pension requirements. The almost universal practice is to make payments from current earnings. As the number of employees eligible for pensions has increased, this policy has created a serious problem. A majority of the executives believe that the present plan is not satisfactory, but opinions vary concerning steps which should be taken to improve the situation.

Discussing the desirability of pensions, J. N. Shannahan, president Omaha & Council Bluffs Street Railway, states: "In general, I consider a pension plan for old employees a necessary arrangement, and if there were none in effect I am sure we would have to take steps toward the adoption of one." A similar opinion is expressed by K. B. Thornton, general manager Montreal Tramways, who says: "I believe that it is only fair and right that the company should grant a pension to employees after a period of 25 years of faithful service, and I think that the company should devise some means whereby it can be provided."

A pension plan is very desirable both for the company and for the employees, according to T. Julian McGill, vice-president Twin City Rapid Transit Company. On this subject he says: "It is quite impossible to discharge men who have become too old or too disabled to perform a satisfactory day's work after they have worked for a company for many years. Without pensions, such situations require donations or special jobs, making somewhat of a beggar of the employee and naturally decreasing the efficiency of the company. We consider an old-age pension essential both from a business and a humane standpoint."

Speaking for the Washington Railway & Electric Company, H. C. Kimball, assistant to the comptroller, says: "We consider a pension plan to be a practical and satisfactory arrangement and we would favor the establishment of the same if we did not already have one in effect." Similar sentiments are voiced by F. L. Butler, vice-president Georgia Power Company; Fred D. Gordon, vice-president and general manager Cumberland County Power & Light Company; C. C. Vargas, vice-president Key System Transit Company; Elton S. Wilde, president Union Street Railway, New Bedford, Mass., M. H. Parkinson, auditor Municipal Service Company, Altoona, Pa., and Hugh J. Sheeran, president New York Railways Corporation.

AGE AND SERVICE REQUIREMENTS

In general the pension plans in effect in the electric railway industry stipulate an age limit for retirement of from 60 to 70 years, with a requirement of from 20 to 25 years of continuous service. Continuous employment, however, appears to be variously interpreted. On some properties a lapse of employment of six months to a year is provided; with other companies a longer period is allowed, provided the man's service record is satisfactory. The majority of plans provide for disability retirement at an earlier age, or with a lesser period of service. Certain properties also give wide discretionary powers to a "pension committee," so that execptions may be made in meritorious cases. The Boston Elevated even provides for the extension of pension benefits to the widow for a period of one month or longer at the discretion of the committee. In a number of instances eligibility depends upon membership in the employees' benefit association.

Employees of the Interborough Rapid Transit Company, New York, who shall have attained the age of 70 years, provided they have been in the service not less than 25 years, are eligible to a pension. The plan also provides for pensions to employees with 25 years of service, regardless of age, who have become permanently disabled. The plan of the Omaha & Council Bluffs Street Railway, Omaha, Neb., provides arbitrarily for the retirement on pension of any employee 70 years of age who has been continuously employed for 20 years or more, but an employee with 20 years of service and 65 years of age may, at his option be retired. A disability clause also provides for the retirement of any employee with a service record of 20 years, provided disability is incurred while in the discharge of his duties.

The Washington Railway & Electric Company, Washington, D. C., divides its eligibles into five classes: (a) Employees 70 years of age, with 15 years of service; (b) employees over 55, with 15 years of service, who have become physically disqualified; (c) employees with

Digitized by Google

ANALYZED

15 years of service who have become physically disqualified by reason of injuries received in the discharge of their duties; (d) employees under 55, with 15 years of service, who have become disqualified may be granted limited pensions, within the discretion of the pension board; (e) employees with less than 15 years of continuous service who have become disqualified by reason of injuries received while in the discharge of their duties, for which they are neither wholly nor partially to blame, may be granted pensions for a limited period.

The Boston Elevated Railway is another property which classifies its pension eligibles into various grades, namely, all employees of an age of 65 years or more, with 20 years of service; employees aged from 60 to 64 with 25 years of service, and employees less than 60 years of age with 30 years or more of service. At the discretion of the pension committee and with the approval of the board of trustees, any employee with a 15-year service record who has become totally disabled as the result of accidental injury arising out of and in the course of employment by the company, may be granted a pension. It is further provided that employees with 20 years of service, regardless of age, may be retired if disabled as the result of sickness or injury.

Any employee of the Twin City Rapid Transit Company who has reached the age of 70 years, with 20 years of continuous service and who is a member of the employees' mutual benefit association, and whose salary has been $250 per month or less, is pensioned. Continuation in the service of employees past the age of 70 is subject to the approval of the medical director, department head and the president of the company. An employee who has reached the age of 60 years, whose salary and service render him eligible to a pension, may be pensioned at the option of the pension board. If incapacitated after 15 years of service, an employee is also eligible.

Key System Transit Company, Oakland, Cal., draws a line between employees who "may" and who "shall" be retired. All officers and employees who have attained the age of 70 years shall be retired; such of them as have a continuous service record of 20 years or more are entitled to pensions. Certain classes, including conductors and motormen, may be retired at 65 with pensions, if they have been 20 years or more in the service. Employees between 60 and 70, who have been 20 years or more in the service and who have become incapacitated and who cannot be transferred to other work which they are able to perform, may be retired and pensioned. The same rule applies to employees under 60, with service records of 25 or more years.

Effective Jan. 10, 1930, the Montreal Tramways Mutual Benefit Association, by a large majority of its membership, approved a resolution reducing the retirement age from 65 years to 60 years, at the same time raising the daily pension from $1.50 to $2. One of the most liberal of the plans is that of the Bangor Hydro-Electric Company, which provides for voluntary retirement with pension at age 65, and compulsory retirement with pension at age 70, in each case only 12 years of continuous service being required.

Ready to retire after a quarter century of faithful service. What provision has his company made for his future?

Eligibles under the retirement pension plan of the Georgia Power Company, are classified under four groups. Those who have been in the service more than 30 years and who are 60 or more years of age, are automatically retired with pension, unless they express a desire to continue in the service and are deemed capable of performing their duties. The other groups grade down to 15 years of service, regardless of age, where the employee has become permanently disabled in the course of his employment.

The plan of the Cumberland County Power & Light Company, Portland, Me., makes provision for the enforced retirement of men employees at the age of 65 and of women employees at the age of 60, unless for special reasons they desire to be continued in active service. This plan also provides that men may be retired at age 60 and women at age 55.

One large Southern property has no age retirement and does not pension employees on the basis of age alone, its present arrangement including only employees with 15-year service records who have become disabled. This same property, however, is now considering a general pension plan for taking care of aged employees.

Pensions are available to employees of a railway in the Mid-West after they have been continuously in the service of the company for 15 years. Retirement is optional at 60 years of age and compulsory at 70. Em-

Digitized by Google

ployees who have become totally and permanently incapacitated for further duty with the company, provided they have been in the service for 15 or more years continuously are entitled to a pension for a maximum period of 14½ years.

Many companies make provision for the eligibles to be continued in the service where they are physically able to perform their duties and choose to do so, rather than to retire. In some cases it is arranged to assign superannuated employees eligible to pensions to lighter tasks. Obviously, any arrangement which defers the day of retirement works to the advantage of the pension fund. Not only is the payment reduced but also the life expectancy over which pensions would have to be paid is shortened. The Montreal Tramways latest report shows 66 employees still on the payroll, each of whom had a service record of 35 years or longer. A considerable number of these have passed the retirement age of 60 years, but evidently prefer work at substantial wages to retirement on $2 per day.

It is provided in practically all of the plans now in effect that the pensioned employee may, at his option, engage in other work so long as it is not of a character detrimental to the company's interests.

Pension Rates Based on Previous Wages for Various Periods

General practice appears to favor basing the amount of the pension upon the average annual wages earned during the ten-year period prior to retirement, multiplied by the number of years of service. The amount is usually further fixed by maximum and minimum stipulations. An exception to this rule is the Montreal Tramways plan which provides a flat pension of $2 per day.

The pension plan of the Twin City Rapid Transit Company provides that any employee whose continuous service began prior to July 1, 1924, is entitled to a pension amounting to 2 per cent of his average monthly salary during the last ten years of service, multiplied by the number of years of continuous service, but in no event more than $50 per month, provided his salary or wage has been $175 per month or less. An employee receiving an average wage of from $175 to $250 per month may receive a pension not to exceed $60 per month. Employees beginning their continuous service subsequent to July 1, 1924, may receive 1.5 per cent of their average monthly wage the last ten years, but such monthly pension may not exceed the following: $40, if the average ten-year salary is $150 per month or less; $50, if the average ten-year salary is $151 to $175 per month; $60, if the average ten-year salary is $176 to $250 per month.

The Omaha & Council Bluffs Street Railway has a plan which provides for conductors and motormen a pension of $1 per month for each year of continuous service, with no pension exceeding $30 per month. Other employees eligible to pension are retired on an allowance based upon 1.25 per cent of the annual wages received at the time of retirement, multiplied by the number of years of continuous service; but no pension shall equal more than 35 per cent of such employee's salary or wages received at the time of retirement, and in no event shall it exceed $500 per annum; neither shall any pension be less than $20 per month. The plan of the Interborough Rapid Transit Company, New York, provides for pension allowances upon the following basis: For each year of service 1 per cent of the average monthly wages based on the rate of pay for the ten years next preceding retirement, provided that in no case shall the aggregate pension allowance be less than $20 per month.

Pensions of the Bangor Hydro-Electric Company are computed upon the basis of 1.5 per cent of the average monthly pay received during the last ten years before retirement, multiplied by the number of years of service. The minimum pension is $15 per month.

The Boston Elevated Railway has had a pension plan in effect since 1920. In the intervening years several changes have been made in the provisions of the plan, but the present arrangement provides that the amount of the pension shall equal 1 per cent of the average yearly earnings for the ten years prior to retirement, times the number of years continuously employed, but such pensions shall not be more than $2,000 per year nor less than $375 per year.

Pension allowances authorized by the Washington Railway & Electric Company are fixed upon the following basis: If the service has been continuous for 15 and less than 20 years, 20 per cent per annum, in equal monthly installments, of the average annual wages for the ten years next previous to retirement; if the service has been continuous for 20 and less than 25 years, 25 per cent of the average annual wages for the ten years next previous to retirement; if the service in the company's employ shall have been continuous for 25 years, 30 per cent per annum of the average annual wages for the ten years next previous to retirement; if the continuous service exceeds 25 years, then for each year in excess thereof there shall be allowed an additional 2 per cent of the average annual wages for the ten years next previous to retirement. It is provided, however, that the pension allowance to any employee shall be not less than $20 per month nor more than $50 per month. There is further provided a funeral allowance of $100 to be paid upon the death of any employee on the pension roll.

Wide discretionary powers are vested in the pension board of the Key System Transit Company, Oakland, Cal., by a clause which provides that "for exceptionally long and unbroken service, with first-class record, or for other good and sufficient reasons apparent to the board of directors, upon recommendation of the board of pensions, the board of directors may, at its discretion, place any officer or employee on the pension list and fix a pension or pensions at such an amount as may in the judgment of the board of directors be equitable and appropriate." The regular pension allowances of this company, however, are authorized upon the following basis: For each year of service, an allowance of 1.5 per cent of the first $50 of the highest average monthly pay of the officer or employee during any consecutive ten years of service, and in addition, 1 per cent of any excess of such highest average monthly pay over $50; provided, however, that in no case shall the allowance made be less than $20 nor more than $75 per month.

The plan of the Georgia Power Company contains a clause providing that "all annuities shall be based on the gross earnings of employees during the 12 months next preceding their retirement."

The amount of each pension is based upon a combination of age and years of service, under four classifications. Those 60 years old, with 30 years or more of service receive a yearly sum equivalent to 30 per cent of the gross earnings, as set forth above. Those with service records of 25 years and not more than 30 years, receive 27.5 per cent, while those with service records of between 20 and 25 years, and who have reached the age of 60, receive 25 per cent of the last twelve months earn-

Digitized by Google

ings. Total disability, following 15 years of service, regardless of age, entitles the employee to a pension based upon 25 per cent of his last year's wages.

Retirement annuities of the Cumberland County Power & Light Company range from 1.5 per cent to 2 per cent of the average annual salary of the employee for the period of continuous service, times the number of years of service, but not exceeding 50 per cent of the final annual salary nor shall the amount exceed $6,000 per year.

Payments Made From Current Earnings

Few of the properties reporting have set up an adequate reserve to meet future or accrued liabilities. The usual method followed is to make payments from current earnings. A notable exception is the Montreal Tramways, whose plan, based upon well-considered principles, has permitted the accumulation of a reserve of more than $540,000. Following an analysis of its plan in 1923 the Twin City Rapid Transit Company began to deposit to the credit of its pension fund $10,000 per month. At the present time payments are aggregating about $50,000 per year, and the company's reserve as of July 1, 1930, has reached $608,159.32. Another large company inaugurated its pension plan in 1910 by setting aside 0.25 per cent of its gross receipts to meet contingencies. A reserve of approximately $50,000 has been accumulated during the intervening years, but at the present time pension disbursements are taking practically all of the regular allotment and no additions are being made to the reserve. One of the most recent plans, that of the Cumberland County Power & Light Company, makes provision for setting aside 1 per cent of the annual payroll from which to meet future retirement pensions.

"Under the terms of our agreement with our employees' mutual benefit association," writes a Mid-West executive, "the company sets aside 1 per cent of its operating revenues to cover relief work and pensions. The balance available after current payments on these accounts is turned over to a trustee to be credited to the pension fund, but in no event is the amount so created to be less than 0.5 per cent of the company's operating revenues in any one year. The employees themselves make no contribution to the pension fund."

With a few notable exceptions none of the plans examined provide for contributions from employees, although several properties maintain benefit associations or even life insurance plans in which employees participate through regular deductions from their wages. Members of the Montreal Tramways association are charged an admission fee of $1, and pay monthly dues of $3. This sum, however, covers much more than the pension, as the association pays its members sick and disability benefits, as well as permanent disability benefits, provides medical and pharmaceutical attention and pays the premium to an outside company on group insurance to the amount of $1,000 on each member.

The Washington Railway Relief Association, maintained and supported by employees of the Washington Railway & Electric Company, provides, among other things, for sick benefits, life insurance and a pension of $30 per month to each member who receives a pension from the company. There is, however, no connection between this pension and that of the company, so the plan cannot be strictly classified as a contributory one.

While few of the properties providing pensions appear to have sought actuarial advice when the plans were inaugurated, a number have since done so and others are contemplating early action in this direction. When the Montreal plan was first organized a competent actuary analyzed it and decided that the association could be successfully conducted along the lines proposed.

One large operating company states: "We have had actuarial computations which show that in the course of years the monthly payment will be extremely high." Another company writes, "When these two plans (pension and group insurance) were put into operation it was forecast that the maximum liability would be reached in five to six years, but this was not the case. In 1929 a detailed study was made of the future liability, and it was estimated that the costs would be 40 per cent greater in ten years than at the present time." One property which has gone into the matter very thoroughly was told by actuaries that $2,250,000 should be invested to guarantee payment of future pensions. Another estimates its pension liability at $500,000.

The Montreal Tramways, which has always supported its employees' mutual association most generously, appropriated for this purpose $158,721.26 in 1929, an increase of $16,260.85 over the 1928 allowance. Union Street Railway reports that 0.68 per cent of the total payroll was required to meet pension payments between 1925 and 1929. It is estimated that 1930 payments will require 1.13 per cent of the company's gross revenues. Another property is at the present time paying out in pensions between $5,000 and $6,000 per month. The Interborough Rapid Transit Company provides for its pensions out of a company donation of "not to exceed $50,000 per year." The Twin City Rapid Transit Company sets aside $10,000 each month for this purpose. The present annual cost of the Omaha & Council Bluffs Street Railway pension plan is estimated at $24,000.

Obligations Become Larger than Original Estimates

From the tenor of the replies received in the Journal survey it is quite apparent that a number of the companies which have adopted pension plans are experiencing difficulty in meeting their growing obligations, while others anticipate difficulty in the future. One company has already announced that, while present pensioners will be taken care of so long as it is possible to do so, no further pensions will be granted until the company's financial position is improved. Another property, in the hands of a receiver, anticipates difficulties at an early date.

The Washington Railway & Electric Company writes: "The number of pensioned employees and the amount of their payroll is at present in excess of the original figures planned by our management, and as time goes on it will undoubtedly be necessary to make some changes in our present system in order to provide for the gradually increasing number of pensioners." A company which, in addition to supporting a pension plan, also carries group insurance for its employees writes: "Our payments for 1929 were much in excess of the maximum estimate when these forms of gratuity were adopted." This company rewrote its entire plan quite recently. Existing pensions will be carried on as heretofore, but the pensions of employees who retire in the future will be considerably reduced below the former figure. Even so, the mounting costs of this form of relief are causing the management serious concern. The Boston Elevated Railway has been obliged to reduce its pension allowance 1 per cent, effective Sept. 1, 1929.

"On account of the average age of our employees I

Digitized by Google

expect that the pension obligations will become very heavy as time goes on," writes C. C. Vargas, Key System Transit Company, while another manager states that although no present difficulty is anticipated he is concerned as to the future and proposes to have an actuarial analysis made. The Georgia Power Company views the future with some uncertainty, in the belief that the present setup holds the possibility of difficulties later on.

"Ours is a joint utility, doing both an electric railway and an electric power business," writes one executive, whose company is setting aside 1 per cent of its operating revenues to meet pension and relief payments. "In the electric utility, which is the fastest growing service, the quantity of labor required per dollar of operating revenue is materially less than in the railway department. The faster growth of the electric business is, therefore, continuously operating in our favor. With the railway utility alone we are quite sure that our present reserve provisions would prove inadequate. The net result has probably been to gradually strengthen the position of the reserve, and while we are not certain of the present adequacy of our reserve fund, we feel that its position is steadily being improved. Certainly, we are in no serious or immediate danger."

With few exceptions the present plans are not definitely contractual. Protective clauses usually provide that the amount and terms of the pensions may be changed or discontinued at the discretion of the management. A typical protective clause provides as follows: "Whenever it shall be found that the basis of pension payments herein provided shall, in the judgment of the president of the company, create demands in excess of the company's revenues available for pension payments, a new basis ratably reducing existing and future pension payments shall be established." Another plan stipulates that "the foregoing provisions for pensioning aged and injured employees are and are to be accepted as purely voluntary and gratuitous, and as imposing no contractual or other obligations upon the part of said companies to continue the same, either as a whole or in any individual case or cases, or to deny to said company the right to withdraw from the same, or to discontinue the said pension, or any individual pension thereunder, if at any time, in their own judgment and discretion, it shall be expedient or desirable to do so, in which event all or any pensions allowed thereunder shall forthwith cease."

The pension plan of the Interborough Rapid Transit Company contains the following clause: "Whenever it shall be found that the pension allowances shall create demands in excess of the annual appropriation ($50,000), and as often as such conditions shall arise, a new basis ratably reducing the pension allowance shall be established to bring the expenditures within the limit of the fund, and the decision of the board of directors in establishing such a basis shall be absolutely conclusive." The Boston Elevated Railway reserves the right to reduce all pensions pro rata so that the entire expenditures for pensions during any year shall not exceed 2 per cent of the salaries and payroll for that year. The Omaha & Council Bluffs Railway plan contains a section which states: "The establishment of this pension system by the company is purely voluntary and gratuitous . . . and the company hereby reserves the right to alter or abolish the pension system and all allowances under it. . . ."

The plan of the Georgia Power Company expressly states that "the company reserves the right to discontinue any and all annuities or any part thereof at any time." The company further reserves the right to withdraw or discontinue all annuities theretofore granted and then being paid, and to alter or amend the plan as necessity may dictate.

Anticipating possible future pension legislation the Cumberland County Power & Light Company stipulates that "in case any benefit, annuity or pension shall be payable by the company under the laws now in force, or hereafter enacted, in any state or county, . . . the excess only, if any, of the amount prescribed in this plan above the amount of such benefit, annuity or pension prescribed by law, shall be the benefit or annuity payable under this plan." The company's board of directors is further authorized under the plan to "annul, alter, add to, or amend, any and all provisions contained in this resolution."

"The establishment of this pension system," reads a clause in the plan of the Bangor Hydro-Electric Company, "is intended only to declare the present policy of this company and to give authority and instructions to the officers of the company to carry out this policy, and neither the establishment of the system nor the granting of the pension, nor any action now or hereafter taken by the pension board or officers of this company shall be held or construed to create a contract." It is further provided that "the company hereby expressly reserves the right . . . to terminate the pension system or any pension or pensions previously allowed, or to modify the pension system in any respect either generally or in its application to any specific case."

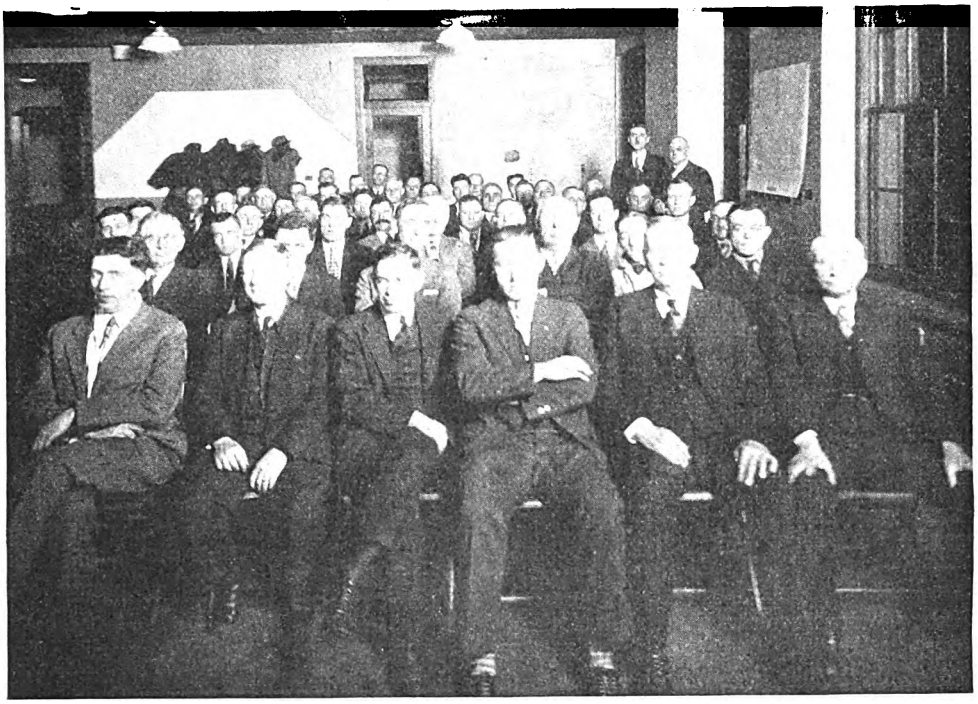
Contributory Support Desirable

Few of the pension plans now in effect require any contributory support from the employees themselves, although a number of executives replying to the Journal's inquiry expressed themselves in favor of some such arrangement. For example, one executive writes: "From our experience, I do not believe a company itself should attempt to carry a pension plan; it should be taken out with one of the established life insurance companies. A pension plan, in effect, is for the purpose of creating an estate for an employee in his old age from which he may derive an income. If his savings plus a similar contribution on the part of the company could be held over a term of years until he comes to the retirement age and then distributed to him with interest over the remainder of his life, it would have the same effect as a pension plan and might have some better features. I feel that our men would appreciate a pension plan more if they were to contribute to a portion of it."

"I believe that the employees should contribute to this future annuity," writes a general manager whose company has a successful plan in operation, "and that the employer should charge against each year's operations the present value of his future pension liability accruing on account of employment during any year. I further believe that the employers' and the employees' contributions should be deposited with some outside trustee."

"I am strongly convinced that the employee should pay something toward his pension," writes an executive whose company has supported a pension plan for the past sixteen years. "In the first place," he continues, "one is not so apt to appreciate something for nothing as he would something to which he had personally contributed. In the second place, it is an increasingly heavy drain on any company to carry its pension costs unaided, especially where there is a very small labor turnover. More and more men are growing old in the service and will ultimately be candidates for pensions."

Digitized by Google



Group participating in track foremen's training classes conducted by the Cleveland Railway

SELLING AN IDEA
to the Foreman

"IF YOU were asked who is the key man constituting the bridge between capital and labor, between executives and wage earners, what would be your reply? Mine would be the foreman. The influence, the importance of the foreman is but poorly understood by many employers. Correcting this defect would mean much for the furtherance of better relations between employers and employed and of national stability. American foremen, collectively, have more to do with molding sentiments among the rank and file of the people and families of this country than politicians, editorial writers, preachers, teachers, or labor union leaders, or any other class. Training schools for foremen should constitute an outstanding feature of American industrial and economic life."

—B. C. FORBES, EDITOR *Forbes' Magazine quoted from the Cleveland News*

By HOWARD H. GEORGE
Superintendent of Way Cleveland Railway
Cleveland, Ohio

In the belief that standardization of track construction and maintenance methods can best be brought about by uniformity of instruction, the Cleveland Railway has conducted a foremen's training course which has produced excellent results.

ON THIS very important subject the writer is in full accord with Mr. Forbes. Many track operations today require more than ordinary skill and training for which the run of common labor is not fitted. Because of the conditions which exist in the field from which our labor must be recruited, it is doubly important that the work be in the charge of a competent foreman and that each foreman be thoroughly instructed as to what is expected of him.

In order to put this theory into practice, there was organized, during the past winter, in the Way Department of the Cleveland Railway, a track foremen's training class. The membership in this class comprised all division foremen and general foremen, together with a selected group of foremen and sub-foremen, whom we had reason to believe would develop, in such a school, into suitable foreman material. Classes were held one evening each week during the first three months of the year, and attendance was compulsory for the division foremen and general foremen, but optional with the others.

A regular series of talks was mapped out in advance covering all the more important phases of track construction and maintenance operations. These talks were mimeographed and, at the close of each class, a copy

Digitized by Google

Code of Ethics for Foremen

CLEVELAND RAILWAY—WAY DEPARTMENT

[1]

The foreman should regard his profession as a field of social service offering an opportunity to help working people obtain maximum satisfaction from life.

[2]

The foreman should endeavor to earn, and guard carefully, a reputation for good moral character, good citizenship and common honesty, and to support and promote the uplifting influences of the community.

[3]

The foreman should recognize that every man above, beside, or below has an inherent desire to do good work and to be a useful and respected citizen. He should not assume that any man wants to do anything less than his best until he has considered every other possible motive.

[4]

The foreman should keep an open mind on all subjects, striving to maintain a broad and balanced outlook, and being always willing to recognize merit in another's ideas.

[5]

The foreman should deal fairly with the management, the men and other foremen, assuming responsibility for his own mistakes and refraining from shifting blame to others.

[6]

The foreman should strive to understand the principles of business which make for success or failure of industry. He should pass at least some of the fundamentals of business principles along to his men, so they can see their own relation to the general scheme.

[7]

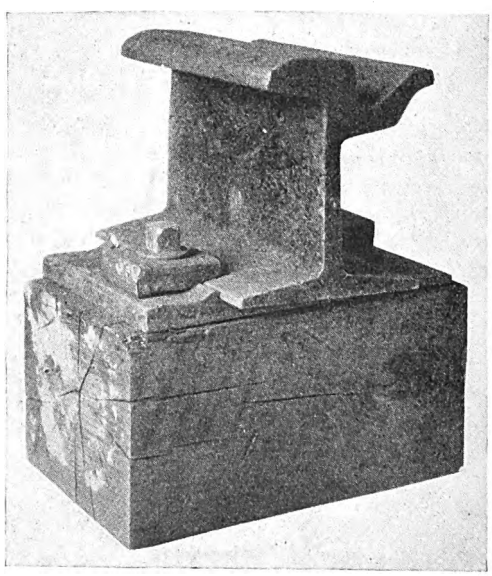
The foreman should keep informed as to the latest developments in equipment and processes. He should recommend, or put into effect, such methods as will produce improved quality, lower costs for the product, and better working conditions.

was given to each member present. Each lecture was informal but covered the same field as the printed copy which the men afterwards received, so that they had it available for reading and study during the ensuing week. The talks were illustrated with blackboard sketches, models and large scale blue prints.

The first half hour of each evening was devoted to a written examination covering the subject of the preceding week. The next three-quarters of an hour were devoted to the subject for the evening. There followed fifteen minutes for reading to the class the correct answers to the questions covered by the quiz of the evening, and the last fifteen minutes were devoted to general questions and answers.

Perhaps some of you will say "Maybe George can do it, but if all his track foremen can read and write, he is more fortunately situated than I am." My answer is that our situation in this respect is actually no different from that which probably exists on any other property of our size. Out of the total registration of 45 in the class which we conducted, ten were of general supervisory grade and were not required to take the written examination. The men, however, were required to attend class and assist in the conduct of the examinations, as will be explained more fully later. Of the remaining 35 who took the examinations, nineteen were unable to read or write although, in every case, they had been track foremen or sub-foremen for many years. Most of the men who could not read or write were Italians. Where the men were unable to read for themselves, they arranged to have some one read the various lectures to them during the week. Usually this was done by one of the older children in their own family who had the advantage of at least a grammar school and frequently a high school education.

In the written quizzes, we assigned one of our supervisory force or some one from our engineering department to sit with each man who was unable to write. These helpers read and explained the questions and put down the student's answers in as nearly their own language as possible. Each question was given a rating, based upon a total mark of 100. In no case did spelling, grammar, punctuation or penmanship play any part in the grading of the answers. We were entirely satisfied if the answer convinced us that the man knew what the correct answer was in each case.



Model of grooved girder rail and tie assembly, with screw spikes and clips, used in demonstration before foremen's training group

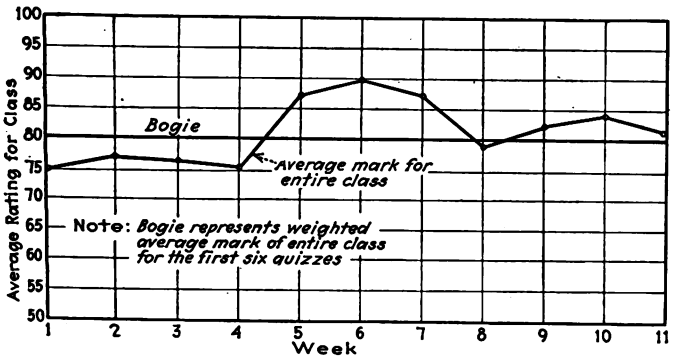
At the opening of the course, each member was furnished a copy of the small printed booklet prepared by Howard J. Montgomery, Chicago, entitled "If I Were a Foreman." This booklet, while necessarily containing some reflections which do not apply to the track foreman, certainly does contain many observations which fit his case admirably, and if the track foreman will study them and apply as many as possible to his own case, he cannot help but increase his value to his employer and raise himself in the estimation of those directly under his control as well. In addition, we furnished each man in the class with a copy of the Code of Ethics for Foremen, which was prepared by a committee of the National Association of Foremen.

Digitized by Google

The subjects scheduled for discussion at the various classes were as follows:

Purpose of Course and General Duties of Track Foreman.
Subgrade, Drainage and Ballast.
Ties.
Rails and Rail Joints.
Miscellaneous Rail Fastenings.
Track-laying and Surfacing.
Pavement and Its Foundation.
Welding and Grinding Rails and Joints.
Track Tools and Equipment.
Track and Pavement Maintenance Practices.
Safety First Talk on Accident Prevention.
Review and Track Construction Moving Pictures.

When the classes were announced, we were flooded with requests to be allowed to attend, and could easily have formed three classes had membership been thrown open to all applicants. In order to ascertain how much of the interest was real and how much was forced, we extended to any one in the class the privilege of dropping out after the fourth session, but only one man took advantage of the opportunity. The men were willing and



Progress made by Cleveland track foremen's class, as indicated by average rating of all quiz papers submitted. The heavy horizontal line represents the bogie, determined by calculating the weighted average rating of the class for the first six quizzes

anxious to learn and displayed a disposition to work hard and acquire what knowledge we were trying to teach them.

There was, at first, a feeling among a number of the men that they were being examined for the purpose of determining whether or not they were to be retained in the service or discharged, and there was, as a consequence, some uneasiness on this score. We were soon able, however, to reassure every man on this score by making it clear that we had but two objects in view in organizing the class. The first was to help the men increase their own knowledge of the business, and to enable us to become more familiar with their individual qualifications. The second was that, through the course, the Cleveland Railway would benefit by reason of better supervision of its track work, with a resulting higher standard of construction and consequent longer life of its track structure.

What we are trying to do is to give every foreman the same kind of instruction, to the end that our work may be more uniformly done. We are striving to impress upon the mind of each man the important relation between the care which is given the various details of construction and the life of the structure. The only practical way this can be accomplished is by getting the men together in a class.

Just how much we will be able to accomplish, as compared with the goal towards which we are striving, remains to be seen. Judging, however, from the interest which every man in our last winter's classes displayed, and from the intelligent questions which were asked in open class, there is no doubt regarding the outcome, and we will undoubtedly make this class an annual affair. It is even possible that the course will be split into two classes, one for the more advanced men, the other for the more backward. Suffice it to say that the results obtained thus far have fully justified our expectations.

Effective Sales Promotion Work by Trainmen at Norfolk

By F. C. Womack

Manager of Transportation Norfolk Division
Virginia Electric & Power Company

SALES promotion of street car and bus transportation is the only solution for the gradual yearly falling off in gross revenue that is now so threatening a menace to the very life of the industry. Definitely committed to this policy, the Norfolk division of the Virginia Electric & Power Company is preparing to launch an intensive campaign of transportation sales promotion in Norfolk which is in line with like campaigns to be inaugurated in the other divisions of the Virginia Electric & Power Company in Richmond, Portsmouth and Petersburg.

With the steadily increasing popularity of the automobile, there has been a corresponding decrease year by year in the gross revenue to transportation companies throughout the country for street car and bus transportation. This decline, which during the past five years has varied between one and five per cent annually, presents a grave emergency which transportation companies must meet and overcome if they are to continue to furnish reasonably good service.

During this same period, realizing that the emergency must be met, transportation companies have concentrated their efforts toward reducing the cost of operation and at the same time increasing efficiency. In this they have, as a rule, been remarkably successful. Under the principle of mass purchasing and other modern methods, the companies have been able during this period to greatly increase efficiency, replace old with modern equipment, speed up schedules and, at the same time, pay a higher wage to the operator—all at a decreased yearly cost of operation.

This decrease in the cost of operation, to some extent, has acted as a sort of financial buffer to take up the shock of the gradual falling off in gross revenue. The situation has now reached the place, however, where the cost of operation has been cut to the bone, and still there is no letting up in that gradual falling off in gross revenue. The one solution which will solve the problem is the "selling" of bus and street car transportation to the public.

The main cog in the operation of this sales promotion machinery is the operator of the street car or bus. Through our experience in accident prevention contests, we have found that the men who operate our street cars and buses are always ready and willing to stand four-square behind whatever move for the betterment of the company in which the officials show a real interest. Convinced that the officials were vitally interested in the reduction of accidents, the Norfolk division during March reduced the number of accidents to less than 50 per cent

Digitized by Google

of the number for the same month a year ago. Last year the total number of accidents in the Norfolk division was 273. This year it has been reduced to 127. One of the main factors in this reduction was the fact that the men at the controls of the street cars and buses, realizing that the heads of the company were vitally interested in reducing accidents, became imbued with the same interest.

A similar result can be achieved when the operators realize that the heads of the company are vitally interested in increasing the number of customers. Once we can get the operators to look upon every pedestrian and every person they see in a private automobile as a potential customer to be treated as such, much will have been accomplished toward selling street car and bus transportation to the public.

But this is only the first step in sales promotion. Following close behind this there must be a concentrated effort toward educating the public away from the single cash fare. In every instance possible an effort will be made to sell the customer tokens or a weekly pass. One of the characteristics of the American people is that they are inclined to use what they have. Sell a man six cigars and he will smoke twice as much as he would if he bought these cigars one at a time. Sell him a block of theater tickets good any time during a period of six months and he will use them up in the first six weeks. The same is true of street car and bus transportation. Half a dozen tokens sold at one time mean that the customer will ride just about twice as often as he would upon a cash fare basis.

As a final link in the sales promotion activities of the Virginia Electric & Power Company, a group of highly intelligent salesmen will be employed to carry the message of street car and bus transportation direct to the potential customer. To those people living along the suburban lines who have been accustomed to depend upon their own automobiles in most instances and who use the street cars and buses infrequently, the railway will appeal upon the basis of economy, showing them in actual dollars and cents that we can carry them to and from their places of business at a saving. At the same time we are committed to a program of speeding up these suburban lines and maintaining thereon regular schedules of operation that can be depended on. We expect the going to be hard in these sections at first but in the end, we feel certain we will be able to greatly increase business along these suburban lines.

It is an entirely different story with the car owner living in those districts where frequent and steady schedules are maintained and it is upon this type of potential customer that the transportation salesmen will concentrate their activities. In every city there are literally thousands of car owners—merchants, professional men, clerks, salesmen, men in practically every walk of life—whose daily activities are confined to a single office building or store in the business district. For month after month and year after year these men have been using their private automobiles as a means of transportation to and from work all unmindful of the fact that the power company maintains bus and street car service in their district that offers transportation that is not only cheaper but faster than their own cars. It is this type of citizen who must be sold upon bus and street car transportation if the steady decline in gross revenue from this source is to be checked.

Selling of this transportation is to be no hit or miss proposition. There will be no dealing in generalities when our salesmen approach these prospects. Each man's individual case will be surveyed and studied for weeks in advance before the salesman calls upon him. As a result, the transportation salesman will have concrete facts to work upon when he goes in to sing the praises of street car or bus transportation.

These data are to be obtained first through a study of the automobile license numbers in the different parking stations in the business district and along those streets where parking throughout the day is permitted. Through a follow up system the names of these different car owners will be secured and then for several days the movement of each car will be studied. Distance between the parking station and the place where the owner is employed will be computed, driving hazards will be determined, the cost of parking will be determined and a check of the actual weekly mileage in driving between home and work will be computed.

Once these data have been compiled—and they will be comparatively easily secured—the transportation salesman will call upon the prospect armed with information which will prove conclusively that the bus and the street car offer him quicker, safer and cheaper transportation day after day, week after week, and year after year between home and work. We believe that this campaign will prove effective. We believe, also, that it is the only manner by which this steady decline in gross revenue from bus and street car transportation can be stopped.

London "Tube" Extensions to Cost $65,000,000

CONTRACTS amounting to approximately $65,000,000 are about to be placed by the London Underground group of railways for extensions and reconstructions on the Piccadilly line. Two extensions are to be started, one to the north from Finsbury Park to Cockfosters, at a cost of $25,000,000, the other west from Hammersmith to Northfields, at a cost of $17,500,000. The balance of the $65,000,000 is to be spent on reconstructing existing stations.

The whole of this work will be carried on simultaneously, and will give employment, when in full swing, to more than 20,000 men. It is hoped to complete both extensions and reconstructions in from 2½ to three years.

This concentrated effort, the largest ever embarked upon by the Underground group in so short a space as three years, has been rendered necessary by the phenomenal growth of London traffic in post-war years.

Work on the Cockfosters extension is expected to commence on Sept. 1 and to occupy two years to complete, but as soon as the line has been carried as far as Arnos Grove, roughly one-half the total distance of 7½ miles of track, it will be opened to the public.

The construction work will involve tunnelling from Finsbury Park nearly to Arnos Grove. There the line will come out into the open, and will be carried across Arnos Park by a viaduct, to disappear into a tunnel on the north side, where the land rises considerably, coming into the open again at Chase side. Thus in the 7½ miles there will be 4 miles of tunnel.

The western extension to Northfields will follow the line of the District Railway. It will be above ground all the way.

Leicester Square is to be made into a subsurface station. It will be a second Piccadilly Circus, but on a

Digitized by Google

smaller scale, with one set of escalators connecting direct with the platforms. Four entrances will be provided to the booking halls from the pavement level, one at the Hippodrome Corner, another at Wyndham's Theater Corner, and two just north of the present station on either side of Charing Cross Road.

In the reconstruction of Dover Street station the existing entrance will be abolished. Two new entrances provided, one on the south side of Piccadilly, close to the Ritz Hotel and the entrance to Green Park, and the other on the north side near Devonshire House. These will lead by escalators to the platforms.

Similarly, at Hyde Park Corner, entrances are to be made to the station from both sides of the thoroughfare, so that it will be possible to walk by a subway under the road between St. George's Hospital and the Park.

At Knightsbridge the alterations contemplate the construction of new entrances at the top of Sloane Street to the east and at the corner of Hans Crescent to the west.

Another improvement is the provision of interchange facilities between the British Museum Station, on the Central London Railway, and Holborn Station, on the Piccadilly line.

International Tramway and Bus Association Holds Biennial Meeting at Warsaw

EUROPEAN transportation men found much of interest at the 22nd convention of the Union Internationale de Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles (International Tramway and Bus Association) which was held at Warsaw, Poland, from June 29 to July 2.

The convention opened informally with a reception at the Polish National Club on Sunday evening, while the official opening was held the next morning in the salon of the Warsaw City Hall. The meetings were presided over by F. de Lancker, managing director of the Brussels Tramways, who is president of the association. Addresses were made by Alphonse de Kühn, minister of communications in Poland; Mr. Szpotanski, vice-president of the Municipal Council of Warsaw, and Mr. Budkiewicz, president of the Polish Union of Means of Transport. In these addresses, the history of Poland since the war was outlined, with particular reference to the plans for modernizing the country's transportation systems.

Technical sessions were held on Monday, Tuesday and Wednesday, both morning and afternoon. A number of papers on a wide range of topics were presented. A paper was read by E. Jayot, director general of extensions, Perfecture of the Department of the Seine, on the comparison of subways and surface lines. Dr. Wilhelm Pforr, general manager of the Berlin Transportation Company, presented a paper on braking tests, following up the work that was done by the committee reporting to the Rome convention two years ago.

At the Monday afternoon session was presented a report prepared by M. H. Coens, chief of substations and distribution of the Brussels Tramways and A. Allard, chief engineer of the Suburban Railways of Brussels, on the subjects of energy distribution for tramways and comparison between systems of conversion from high-tension alternating current to low-tension direct current. Another report presented was prepared by Gaetano d'Alo, traffic engineer of Milan, Italy, on the track structure. A paper was read by P. Lo Balbo, research director of the Piedmont, Italy, tramways, on storage battery vehicles for rail service in Europe.

Two sessions were held on Tuesday, at which numerous reports were given. Dr. Philip Kremer, manager of the Frankfort a.M. Tramways, prepared a report on improvements in rolling stock for railways and road transport with respect to the comfort of passengers, facilities for service and improvement of operation. This report was a comprehensive review of recent European practice in car and bus design. H. Arnold, general manager, and F. Eichelhardt, chief engineer, both of the Vestischen Railway, Herten, Germany, reported on the use of internal combustion motors burning light oils for rail service. R. Podoski, professor of engineering at the Warsaw Polytechnic School, presented a paper on studies of electrolytic corrosion.

A report on the comparison of systems of co-ordinated transport including tramways, rapid transit lines and buses, was prepared by M. Nestrypke. A paper was read by M. Lange on automatic block signals for single track. Another paper was by L. Sekutowicz, Paris, on the use of light-weight metals in overhead line construction.

Wednesday's session opened with a discussion of the report by H. Werner, vice-director of the Vienna, Austria, tramways, on the development of electric equipment of rolling stock. This report was principally a tabulation of answers to a questionnaire relative to the design features of recent types of propulsion motors, especially those with high-speed armatures developed for the new types of drive. The last paper was that of L. Bacqueyrisse, general manager in charge of operation and technical service of the Société des Transports en Commun de la Region Parisienne, which operates all the transports in Paris, on methods of facilitating the use of the service by passengers on buses, tramways and rapid transit.

At the concluding session President de Lancker summed up the discussion which was held on the various papers and reports. It was decided to continue the preparation of information on the same subjects, to be presented at the next convention, which will be held at the Hague in 1932. Much interest was shown in regeneration of electric energy, and it is planned to make a special report on this subject. A special meeting probably will be held in Paris next October to witness tests of three cars fitted with regenerative equipment.

Following the meeting trips in Poland were taken by three groups of delegates. One of these was to the cities of Krakow and Katowice in Southern Poland, where many of the manufacturing plants are located. The three groups joined at Poznan on July 5 to assist in the formal opening of the International Exhibition of Transport and Touring being held in that city this summer.

Digitized by Google

This 85-ton locomotive has been built for service on 1,500 volts and 600 volts, both trolley and third rail

Double-Voltage Operation Features Midland Utilities Locomotive

Service can be given on 1,500 or 600-volt lines on its several subsidiary railways by changes of circuits and minor adjustments

By T. F. Perkinson
Transportation Engineering Department
General Electric Company

TWO 85-ton direct current electric locomotives with novel features have been obtained by the Midland Utilities Company of Indiana for service on its various associated lines. During certain portions of the year they will be assigned to the 1,500-volt Chicago, South Shore & South Bend Railroad. At other times, when traffic demands require, they will be assigned to 600-volt associated properties, such as the Aurora, Elgin & Chicago Railroad, and the Chicago, North Shore & Milwaukee Railroad. These locomotives, constructed by the General Electric Company, are arranged for easy change-over of control circuits, auxiliary apparatus, etc., so that operation under a 1,500-volt or a 600-volt d.c. contact line or with a 600-volt third rail can be successfully undertaken.

Mechanically the locomotives are of the non-articulated double-truck type. The center plate of each truck is floating, supported by two transverse semi-elliptic springs suspended from the truck transom by centering hanger links. The transom casting is bolted to steel side frames which carry the pedestal jaws. The side equalizers are unusual, each being formed by two irregularly shaped forged steel plate bars. Two heavy coiled springs rest in cast pockets supported by the two plates forming the equalizer bar and carry the weight of the side frames with their superimposed loads. The wheels are 42-in., A.R.A. standard, with 3½-in. steel tires. The truck brake work is of the spreader type and is actuated by two cylinders, one mounted on each side of the truck frame. The Miner friction draft gear is used and couplers are of the standard A.R.A. type with 6x8-in. shank.

The cab superstructure is of the modified steeple type. The main cab has two operating compartments and an apparatus compartment with passageways on each side. All necessary control apparatus is in duplicate. Each operating cab has 4 kw. of electric heaters.

The center compartment contains the contactors, reverser, resistors, switches, control motor-generator set, etc., necessary for control of the traction motors. Access is obtained through a door from one of the operating compartments. The lower portion of the sides are covered with wire screening, giving a clear view of the apparatus and eliminating the danger of accidental contact with it. The top section of the compartment, containing the accelerating grids, has four transverse ventilators welded to the cab roof, giving natural circulation of air. Each auxiliary end cab houses an air compressor and a propulsion motor-blower set so located that a short

Digitized by Google

direct path from the fan outlet into the longitudinal air duct is secured.

Four GE-704 d.c. series motors for 750 volts drive the wheels through single reduction gearing. These motors are of the box-frame, nose-suspended, forced-ventilated, commutating-pole type insulated for 1,500 volts. Air from the ventilating duct is led to each motor through an all-metal duct arranged to permit swiveling of the trucks. The air is taken in to the motor through an opening in the frame located above the commutator and passes out through protected openings at the pinion end.

The motor armature bearings and axle suspension bearings are of the waste-packed constant oil-level type.

The gears and pinions are of high-carbon steel, heat treated, and forged from solid steel blanks. The gears are of the non-resonant type,ringing being practically eliminated by the use of lubricant retaining rings inside the gear ring on either side of the web.

The control equipment is of the non-automatic electro-pneumatic type, arranged for multiple-unit operation. There are two motor combinations available for each direction of motion on either 600 or 1,500 volts. The first or low-speed combination has eight resistance steps, one full-field running step and one reduced field running step. The second or high-speed combination has seven resistance steps, one full field running step and one reduced field running step. The two groups of two motors each are connected in series on 1,500 volts, and in parallel on 750 or on 600 volts. The first combination connects two groups of motors in series, and the second connects them in parallel.

Principal Data of Double-Voltage Locomotives

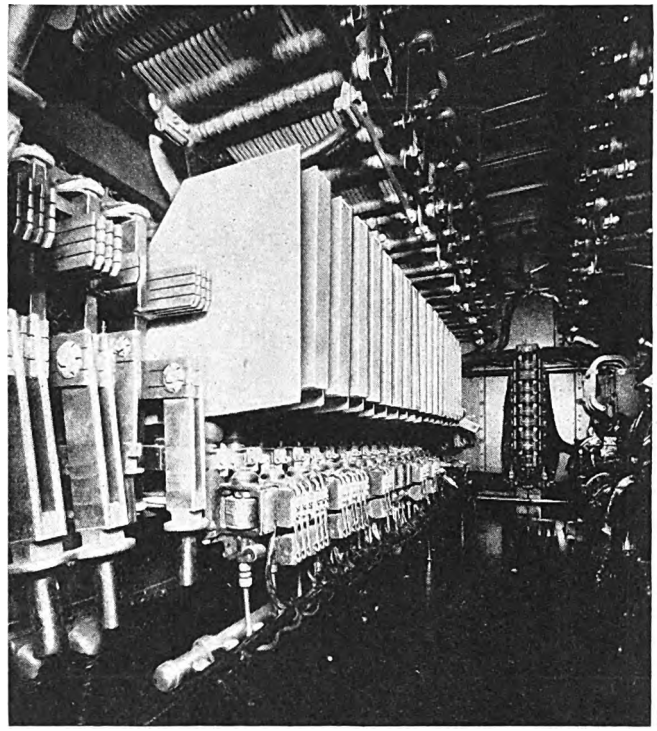
Class of service	Freight and switching
Trolley voltage	1,500 or 600
Driving wheels, number	8
Driving wheels, diameter, in	42
Total weight, lb	170,000
Weight on driver, lb	170,000
Weight per axle, lb	42,500
Weight electrical equipment, lb	57,600
Weight air brake, lb	5,400
Weight mechanical equipment, lb	107,000
Length over knuckles	39 ft. 1½ in.
Width over arm rests	11 ft. 1½ in.
Height, trolleys locked down	14 ft. 0 in.
Total wheel base	27 ft. 0 in.
Rigid wheel base	8 ft. 8 in.
Type of control	PCL, multiple unit
Motors, number and type	Four GE-704-A-1
Gear ratio	71/18
*Continuous tractive effort, lb	16,800
*Continuous speed m.p.h.	26.7
*Continuous current rating, amp.	650
*Continuous output, hp	1,196
*One hour tractive effort, lb	22,600
*One hour speed, m.p.h.	24.3
*One hour current rating, amp.	800
*One hour output, hp	1,465
Starting tractive effort at 25% adhesion, lb	42,500

*Rating given on 1,500 volts at trolley, and motor fields shunted.

Manual knife-blade switches in the main circuits perform the following operations: Selection of trolley, pantograph, or third-rail shoes; connection of the main and auxiliary circuits to the bus line couplers; connection of the traction motor circuits to the source of energy; isolation of individual pairs of traction motors in the event of damage.

Master controllers are of the recently developed cam-operated type. In this the operating lever causes a camshaft to revolve, opening or closing individual contactors in a manner similar to that found in the conventional type of pneumatic cam-operated main-motor controllers used for multiple-unit car service. The reserver handle is mechanically interlocked with the main handle.

Protection for the electrical equipment is afforded by an inclosed expulsion type fuse in the main circuit ahead of the main switch and auxiliary fuse. Individual motors are protected by a series overload relay.



Control equipment and resistors are compactly mounted in a compartment in the center of the locomotive cab

When the locomotives are assigned to territories with different operating voltages, change-over of the main circuits from 1,500 to 600 volt operation, or vice versa, is facilitated by terminal boards to which the motor and grid connections are brought.

There are two traction motor-blower sets, each consisting of a 1,500-volt d.c. motor driving a multivane blower. Each set furnishes air to the pair of motors located in the truck beneath it. The blower motor field coils, armature, brushes, and brush-holders are interchangeable with those of the compressor motors.

The two compressors are of the CP-130, 1,500-volt type, and are designed to deliver 50 cu.ft. of free air per minute each when pumping against a reservoir pressure of 90 lb. per square inch. The compressors are of the single-acting, single-stage type with horizontal cylinders. When the locomotives are asigned to 600-volt territory the compressor motors, blower motors, and the motor of the control motor-generator set will be provided with armatures, field coils and brush rigging differing in electrical characteristics from, but physically interchangeable with, these parts furnished for 1,500-volt operation. Control and lighting energy is furnished by a 2 kw. 1,500/32-volt motor-generator set, which floats across and charges a 200 amp.-hr. "Exide" battery.

Bus line coupler sockets, plugs and jumpers permit emergency operation of two locomotives by means of power furnished solely from either.

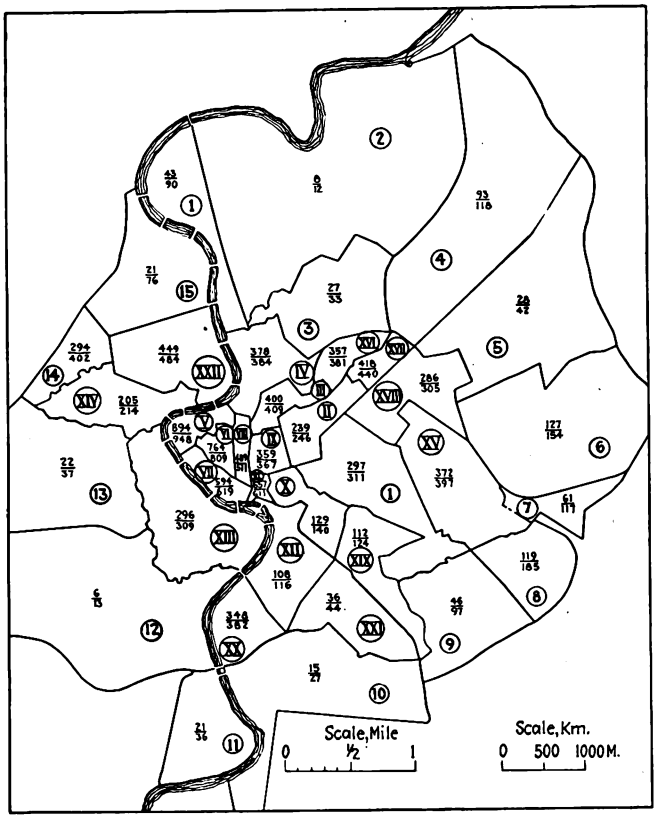
The air brake equipment is of the straight and automatic type manufactured by the Westinghouse Air Brake Company. Each truck has two 10x12-in. brake cylinders mounted on the truck frames and working the brakes for each adjacent pair of wheels. Two air tanks suspended beneath the platform and between the trucks have a total capacity of 43,000 cu.in.

Digitized by Google

Rome to Have

MODERN

Construction of rapid transit line will provide direct routes connecting the principal points in the center of the city with six outlying terminals. It will round out a unified transportation system in which surface cars serve the major portion of the city with buses in the congested central area



Rome population density by districts, 1921 and 1927

The population density is given in inhabitants per hectare, a hectare being equal to 2.47 acres. The upper figure is the density in 1921, the lower is the density in 1927. Roman numbers in circles designate rioni (wards) in the central city and Arabic numerals in circles designate quartieri (districts) in the outer territory now also included in the city of Rome

RAPID transit for the city of Rome, Italy, has been brought much nearer by the preparation of detailed plans for a subway system which are now being studied by the Superior Council of Public Works. The project calls for three lines with a total of 15¼ miles of route. It is estimated that construction work can be completed in 12 years. Additional lines totaling 19½ miles, proposed for later construction, to round out the system, could be completed in 25 years.

Of the three routes included in the first group, as shown on the map, A, the one proposed for immediate construction, is from Piazza Verbano to the Ostia railroad station, with a branch from Porta Pia to Sant' Agnese. The second is that portion of route C between Piazza Re di Roma to Stazione Termini, followed by the remainder of the line C, from Stazione Termini to Viale delle Milizie. Finally, route B would be built from Viale delle Belle Arti to the Ostia station.

These plans are the result of proposals which date back to 1924. In Italy, a city railway entirely within a municipality is under the jurisdiction of the local government, except in the city of Rome, in which all rights are reserved to the national government. In August, 1926, the Minister of Public Works appointed the technical committee to plan a rapid transit system, which has just rendered the report under consideration.

In making the survey, two purposes were kept in view. First was the relief of traffic congestion in the center of the city. This area has winding streets cramped between buildings whose historic and artistic character prohibits removal or modification to provide wider roadways. With the increasing use of automobiles, traffic jams have become so bad that vehicle movement is almost impossible. The second purpose was to permit a redistribution of the population so that more people can reside in the outer districts. The need for this will be seen from the population maps, which give the number of inhabitants per hectare for the wards (rione) of the older central city and the corresponding districts (quartiere) of the outer section.

It will be seen that the three rapid transit lines proposed will skirt the heart of the city, joining Stazione Termini, Piazza Colonna and Piazza Venezia, with six branches extending toward the most important outlying districts. In order to promote flexibility of routing, track connections will be made at two points, Piazza Venezia and Stazione Termini.

Selecting the Type of Tunnel

Shallow subways built by the cut-and-cover method were rejected, in part on account of the cost. It was also considered inadvisable to disturb sections of the ground which might contain material of archaeological importance. Accordingly, the plans have been prepared for the tunneling method such as is used in railroad construction. Toward the outer ends of the line, however, the plans call for shallow subways using the cut-and-cover method. In the lowest section of the city, in the vicinity of the Tiber River, it was decided to use the shield method of tunneling, the tubes being lined with sectional cast-iron rings.

It was deemed inadvisable to adopt special sections for the tube tunnels which differ from those used successfully in Paris and New York. The section shown in one of the illustrations was adopted where possible, and the portion built by the tunneling method is shown in another illustration.

Many test borings along the proposed route indicated that in general there is a superficial layer of soil varying from 7 to 46 ft. In the higher portions of the city there is a stratum of volcanic earth, below which are blue

Digitized by Google

SUBWAY

By

Engineer Ugo Vallecchi

Director of Traffic and of the Technical Office for the Subway System, Rome, Italy

marls and clays. In the lower sections are blue and yellow marls and mixtures of clay and sand. Along the Tiber are large sandy pockets which it is feared may be difficult to handle during the tunneling

While in general the streets are followed, it has been found possible to hold to a minimum radius of 75 m. (246 ft.), limited in general to track at the ends of stations. This radius has made it possible to adopt a car width considerably greater than that used in the Paris subway, without increasing the dimensions of the masonry tunnel or the cast-iron tubes at curves of minimum radius.

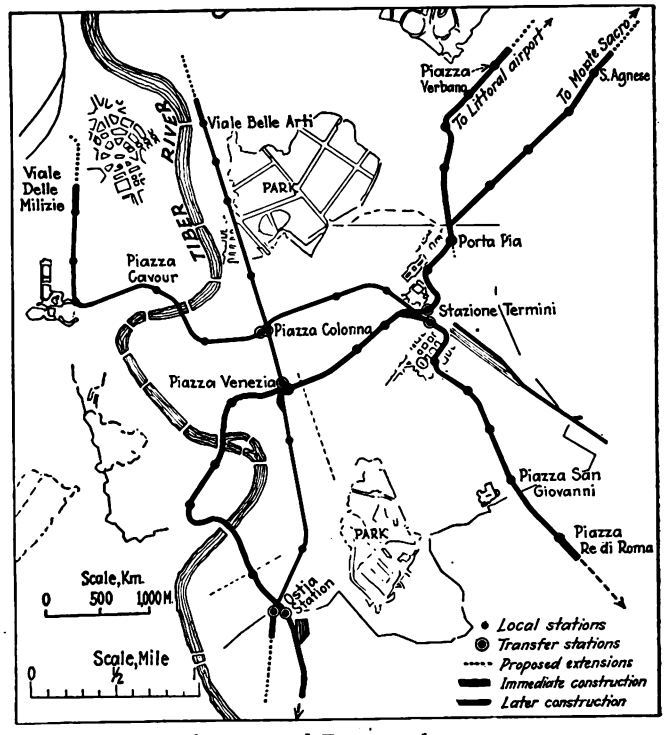
In this connection a study of the maximum permissible speed was made. With stations about 500 m. (1,650 ft.) apart, it was found that a maximum speed necessary to give good schedules was 60 km.p.h. (37.3 m.p.h). It was decided to use a super-elevation of 17 cm. on curves as the maximum. This permits a speed of 37.7 km.p.h. on a 75-m. radius, 45.4 km.p.h. on a 100-m. radius and 59 km.p.h. on a 150-m. radius. The lines also have been laid out so that a straight section of at least 80 m. is left between tangents to circular curves, permitting parabolic easements, with intermediate horizontal straight track capable of containing the four axles of a car between curves.

The maximum gradient is 3.8 per cent at one point on line A and 3.7 per cent at one point on line C.

A study of the use of approach grades at the entrances and exits to stations, calculated for a straight section of track 500 m. long, showed a 22 per cent economy in energy consumption, a 13 per cent reduction in motive power and a saving in time of 4 per cent. These advantages were found to be offset by the increased difficulty of subway construction, the greater exposure to infiltration of water and the impossibility of running express trains and local trains on the same track. The topography also made it impossible to put more than two consecutive stations at the same level. A compromise profile adopted obtains a portion of the advantages of the approach grades.

Considering Location of Stations

It was desired to keep the distance between stations as great as possible, in order to save construction costs, obtain maximum schedule speeds and simplify construction. A study of various systems showed that in Paris the distance between stations varies from 600 m. to 425 m.; in London it is about ½ mile; in Madrid it is close to 500 m.; in Hamburg, 750 m.; in Berlin it varies from 500 to 1,200 m. The distances adopted for Rome average about 550 m. (0.34 mile).



Map of proposed Rome subway system

The main line *A* is 8.603 km. long, with the branch between Porta Pia and Santa Agnese 2.262 km.; line *B* is 5.410 km. long, and line *C* is 7.944 km. long. In addition, connecting tracks of 0.236 km. are planned, making the total length 24.455 km.

In determining the length of a station, the possibility of operating long trains was set off against the financial necessity of investing as little money as possible for future demands. The normal length of stations finally adopted is 80 m. (264 ft.). This is based on the assumption that the cars will have an over-all length between buffers of 15.2 m. (50 ft.). Five-car trains would be 76 m. (250 ft.) long, and would have ample clearance, while six-car trains, with an over-all length of 90.5 (300 ft.) could also be used with the front and rear doors of the trains closed.

Cars with the dimensions proposed will have a normal capacity of about 150 passengers. A six-car train, then, will have a total capacity of about 900 persons. With a maximum frequency of 90 seconds, there will be a capacity of 36,000 passengers per hour, or for an operating period of 20 hr. per day, an ultimate capacity of 780,000 passengers in each direction.

Independent Station Platforms Adopted

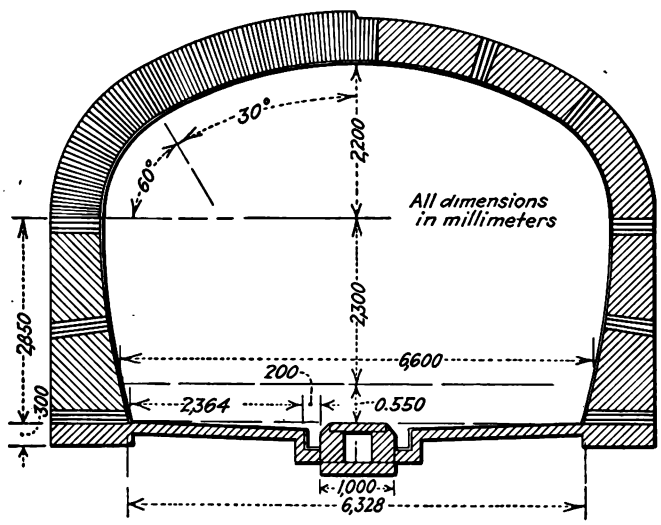
A study of the system of separate platforms on the outside of the track as compared with island platforms was made. In Paris, Madrid, Barcelona and Tokio, outside platforms are used exclusively. In Berlin and Hamburg island platforms are used. In London the ordinary lines have outside platforms, while in the tubes central platforms are standard. Island platforms reduce the total width of the station and simplify the stairways, but lead to interference between incoming and outgoing passengers and, in general, limit the volume of traffic that can be handled expeditiously. It is believed that shorter

Digitized by Google

stops can be made with outside platforms, and passenger travel is confined to one direction. In Paris, the stops average between ten and fifteen seconds, and even in the principal stations seldom exceed twenty seconds, whereas in Berlin the stops equal or exceed double these values. The use of central platforms also involves insertion of curves on each track at each end of the station.

Selection of Rolling Stock

Limiting dimensions of rolling stock are fixed by the subway section. The selection of an internal diameter of 7.3 m. (24 ft.) for the cast-iron tubes thus determines the dimensions of the car. As to clearances it was found that in the Paris subways a clearance between passing trains of 50 cm. was adopted to allow passengers to walk along the tunnel in the event of accident. The adoption of cars with intercommunicating doors, as in the London and German subways, however, makes these clearances



Typical section of Rome subway

entirely unnecessary. Hence it was decided to adopt the dimensions for rolling stock in effect on the principal routes of the Italian State Railways. The minimum clearances between cars on adjacent tracks are 300 mm. (10.8 in.) and 150 mm. (5.4 in.) in a horizontal direction between cars and stationary obstructions. Dimensions of the cars adopted are shown in the illustration. The reduction in width at the ends provides clearance on the curves with 75 m. radius.

Adoption of wheels of 900-mm. (35½-in.) diameter allows the future adoption of motors somewhat more powerful than those previously planned, and gives a height of car platforms of 1.06 m. (41¾ in.) with a clearance of 103 mm. (4 in.) between the wheel and the bottom of the car floor. With station platforms 1 m. (39.4 in.) above the rail level there is a difference of 6 cm. (2 5/16 in.) between the platform and the floor of the empty car. All cars, both motor and trailer, have been designed alike. The couplers will be indentical so that it will necessitate only the addition of electrical equipment to convert the trailers to motor cars, if later developments require.

The principal dimensions of the cars are given in the accompanying table.

The general appearance of the cars is indicated in the plan. There will be three doors on each side, 1.5 m. (4 ft. 11 in.) wide. These doors will be of the double sliding type, automatically operated.

Longitudinal arrangement of the seats was adopted to give easier circulation of passengers in the car and to allow better lighting. Since it is proposed, at least experimentally, to provide for two classes of passengers, the trailers can be divided into two parts, permitting one to be finished and upholstered for first-class service.

The seating capacity of the cars is normally 32. There are places for 121 standing passengers in the motor cars. The trailers will have 36 seats and 119 standing passengers. A normal train of five cars will then have capacity for 771 passengers, of whom 168 are seated. The weight will be 184 kg. (405 lb.) per place offered.

Ventilation will be provided by opening the upper section of the windows, or by means of automatic suction fans. This was considered preferable to the use of a monitor deck, being less expensive, more substantial, and better in appearance. The normal train will consist of three motor cars and two trailers, alternating. Until the necessity for greater capacity arises, three-car trains, consisting of two motor cars with a trailer between, will be used. Automatic couplers will make mechanical, air and electric connections between cars.

Substantial Track Construction Proposed

The track will be constructed with Italian State Railway standard rail type FF.SS, weighing 50.6 kg. per lin. m. (102 lb. per yd.), laid on oak crossties, 26 being used in each section of 18 m. This corresponds to a spacing of 27¼ in. Every fifth crosstie will be extended to support the third rail. The same type of track has been adopted not only for the main lines, but also in the stations. In the carhouses and yards, as well as on side tracks rail weighing 36 kg. per m. (73 lb. per yd.) will be used, with 24 crossties for every 18-m. section. On curves of 300-m. radius or less, inside guard rails will be used. The ballast will be made up of gravel and will have a depth of 55 cm.

750-Volt Third-Rail System Used

It is proposed to use the 750-volt direct current system. Although the 3,000-volt d.c. system will be used for future railroad electrification in Italy, it was felt that the clearances with low voltage would be less and that the saving in cost in the distribution system would not have offset the higher cost of the equipment and its maintenance. It was pointed out that with few exceptions all other rapid transit lines in the world use between 800 and 600 volts. One Barcelona rapid transit line uses 1,700 volts for the third rail and the other 1,400 volts with overhead trolley. The Nord-Sud line in Paris has a three-wire system at 1,200 volts, but only 600 volts between each third rail and the return wire. In Berlin and Hamburg 800 volts are used with the third rail. All the other rapid transit systems, including those in America, Paris, Madrid, and Tokio, employ 600 volts. Of these the one in Madrid is the only one using an overhead contact line.

All calculations of motor power were based on the use of a standard train of three motor cars and two

Principal Dimensions, Rome Subway Cars, as Proposed

	Meters	Feet and Inches
Length of body	14.5	47–7
Width of body	2.6	8–6¾
Height, rail to roof	3.3	10–10
Rigid wheelbase	10.0	32–9¾
Truck wheelbase	2.3	7–6½
Length over buffers	15.2	49–10¾
Weight of motor car, metric tons (2,204 lb.)		34
Weight of trailer car, metric tons		20

Digitized by Google

trailers weighing 178 metric tons. The braking rate is assumed at 0.85 meters per second (1.9 m.p.h.p.s.). It is planned to use automatic acceleration and, with an adhesion coefficient of 18 per cent, to reach a speed of 40 km. per hour (25 m.p.h.) in 14 seconds. This calls for an average acceleration up to full motor voltage of 0.8 meters per second per second (1.8 m.p.h.p.s.) and a maximum acceleration of 1.15 meters per second per second (2.6 m.p.h.p.s.). On this basis the type of motors adopted has a one-hour rating of 170 hp. at 750 volts and a continuous rating of 130 hp. at 750 volts. There will be four such motors per motor car, with pairs connected permanentaly in parallel. Electro-pneumatic control will be employed and remote electro-pneumatic devices will govern the action of the third-rail shoes and motor compressors. Each motor car will have a switchboard in the cab at each end. No control equipment is included on the trailers. Multiple-unit control will be used and the trains can be operated from any cab.

The car lighting will be from the 750-volt supply, with an emergency storage battery circuit. Quick-acting air brakes will be employed, with two brake shoes on each wheel.

Electric power will be supplied by a third rail of special steel located between tracks. Copper feeders will be connected to the third rail at each station, by remote control switches. The track will form the return circuit, with inductive bonds so as not to interfere with the signal circuits. The feeders were calculated on the basis of standard operation with three-car trains at intervals of two minutes 30 seconds, while by using the reserve equipment in the substations it will be possible to run either with trains of five cars at the same headway or with trains of three cars at 90 seconds headway.

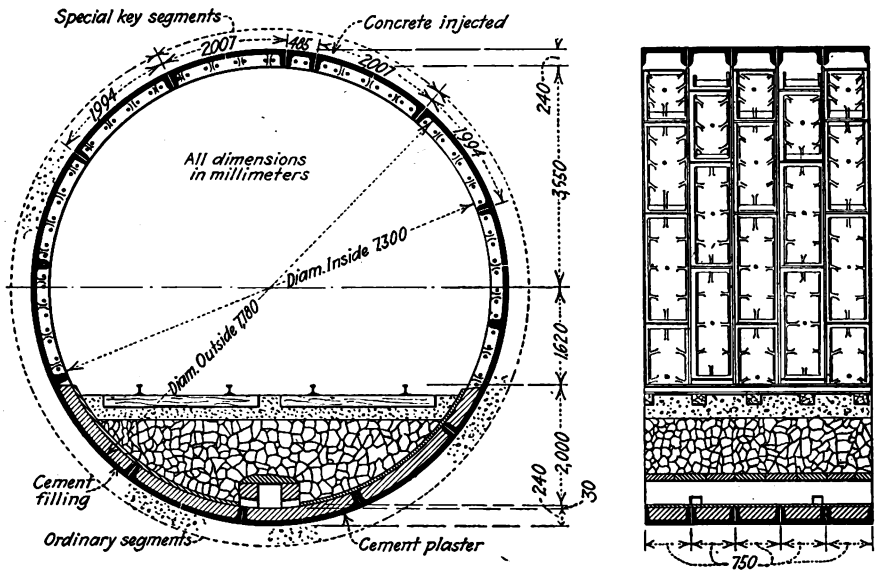
Power will be converted in five substations with a total installed capacity of 30,000 kw., of which 10,000 kw. normally will be held in reserve. An investigation is being conducted to determine the feasibility of using mercury vapor converters instead of rotary converters, and doing so in connection with the regeneration of energy on motor cars.

The substations will be fed from two three-phase lines at 8,200 volts and 45 cycles. For the first line to be placed in service there have also been provided two storage batteries of a total capacity of 1,000 amp.-hr. for discharge in ten minutes, and an average potential of 500 volts. In the event of an interruption in the supply, these batteries will enable any train which may be between stations to reach the nearest stop. These batteries are also connected to the emergency lighting circuits of the stations and of the line.

The block signal installation was designed to permit a frequency of 40 trains per hour, or a headway of 90 seconds. All signals will be of the color-light type. Caution signals will be installed only where the stop signal may not be visible at a sufficient distance for the motorman to stop his train when proceeding at maximum speed.

An automatic train stop will set the brakes and cut off current from the motors of any train that may pass the signal. At the entrance to each station, a safety signal will be located at such a distance from the end of the platform or switch point that a train whose brake has been set by the automatic stop will positively be stopped before running into a standing train in the station. Each station will also have departure signals at the leaving end of the platform. The automatic block signals will show normal clear indications, while the interlocking signals will show normal stop indications and must be cleared for the passage of each train. The signal system adopted is controlled by alternating current in the track circuits. The track circuits, control circuits, automatic stop devices and lamps will be fed by three-phase current of 220 volts. Communication between stations, switch cabins, substations and depots will be by means of a telephone system.

The subway will normally be unlighted. If the current fails an emergency lighting system fed by the storage batteries will be cut in automatically so that passengers may be able to make their exit. An independent system of emergency lighting fed from a separate storage battery will be installed in the stations.



Section of tunnel of concentric cast-iron rings used under the Tiber River and at other points

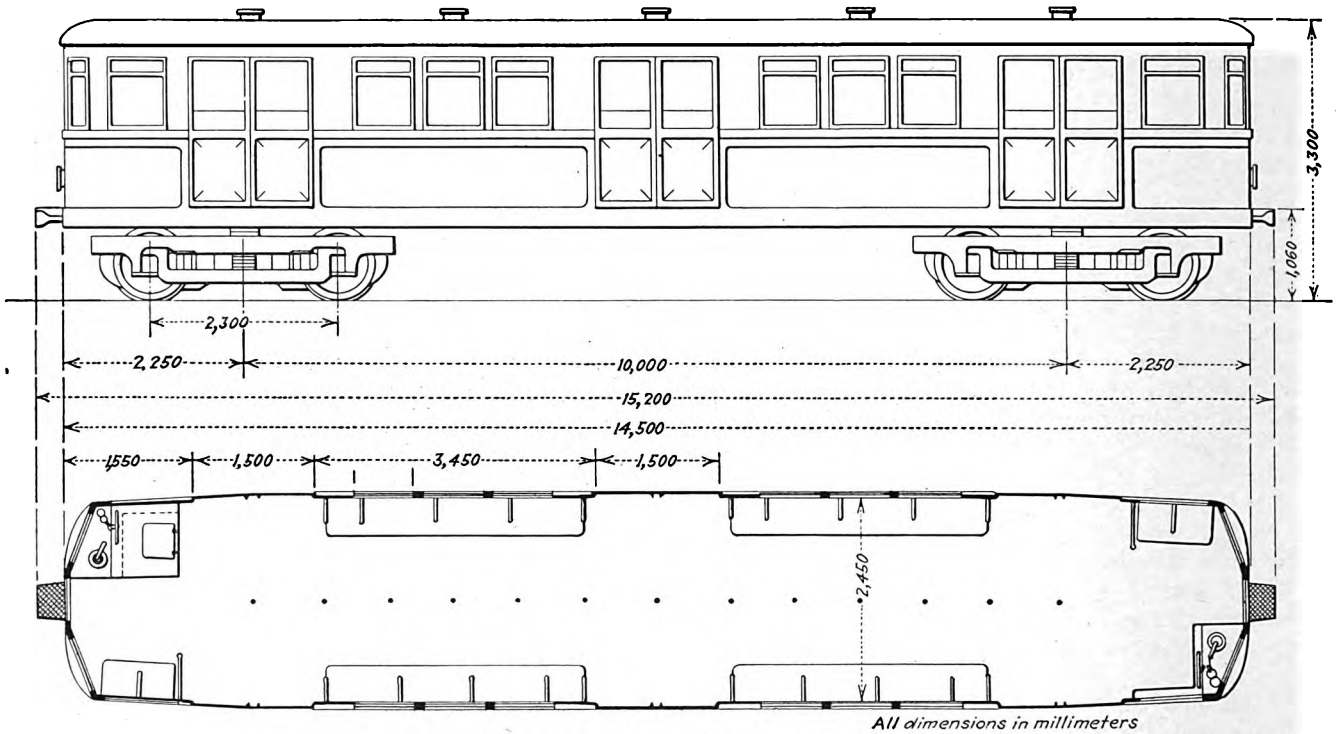
Along each track there will be a pair of exposed telephone wires. By bringing them into contact the automatic switches in the substation will be actuated. The same two wires can be used by the train crew to communicate with substations by means of a portable telephone set. Fire extinguishers will be placed in stations and along the line, their location being indicated by blue lamps fed from the signal circuit. Special switches in the stations will permit the crew to set the signals against movement, in the event of a blocked track.

Shops and Car Storage

Adjacent to the terminal on line A, adjoining the station of the Rome-Ostia line of the state railway, will be the carhouse and shops. Two large adjoining carhouses, 84 m. by 21 m. each, will contain twelve storage tracks, eleven of which are provided with pits for the inspection of the cars. Each track will accommodate a five-car train, making the total capacity 60 cars.

The main repair shop will be placed back of the storage house, being separated by transfer tracks. The shops will have a series of seven bays and will cover 4,400

Digitized by Google



Proposed car for the Rome Subway

Motor and trailer cars will be identical in general dimensions. Control equipment will be placed on motor cars only

sq.m. (47,000 sq.ft.). For six of the bays, intended for repairs on rolling stock, a transverse crane is provided. The remaining bay is reserved for servicing of the lines, tracks, electrical system, signals and miscellaneous work. In front of these bays is to be a two-story building, 2,320 sq.m. (25,000 sq.ft.) in area. On the ground floor will be rooms for the machinery, tools and miscellaneous equipment connected with car repairs. The second floor will contain the administration offices and space for lodgings for officials. The storehouse will be in the end of the shop and office buildings and in the adjacent yards.

There will be a yard with a total area of 4,900 sq.m. (50,000 sq.ft.) in which material necessary for operation will be received. This yard will be served by tracks of the city surface line and through a connecting spur by the state railway system. The storage yard will be served by a gantry crane permitting direct unloading from the cars. There will also be a small storage yard, equipped with pits, and shops for routine night inspections in the terminal stations and in the station at Piazza del Cinquecento on line A.

The proposed schedule calls for the operation of three-car trains on a headway of two minutes 30 seconds. During hours of light traffic the service will be on a five-minute headway. The first runs will start at 5:30 a.m. and the last run will end at 1 a.m. The program calls for the operation of trains with a total capacity of 11,000 passengers per hour in each direction during the rush period. This schedule contemplates the absorption of the business at present handled on the surface cars, so that the plan of co-ordinating the subway system with the present surface car system will be complete.

The construction program provides for the completion of route A within six years. In the two years following the section of route C between Stazione Termini and Piazza Re di Roma should be completed. This will establish rapid transit communication between the center of the city and Piazza San Giovanni, to which point will be transferred the terminal station of the railway to Castelli Romani. In the four years following the second section of route C and all of route B should be built.

The costs of construction and equipment, including damages and allowing for contingencies, are estimated as follows:

	Lire	Dollars
Route A (10.865 km.)	300,000,000	15,750,000
Route C (section between Stazione Termini and Piazza Re di Roma, 3.036 km.)	70,000,000	3,675,000
Route C (section between Viale delle Milizie and Stazione Termini, 4.908 km.)	170,000,000	8,925,000
Route B (5.410 km.)	155,000,000	8,137,500
Total	695,000,000	36,487,500

In order to assure a sufficient return on the capital stock, assistance on the part of the state will be necessary. It is proposed that the state should guarantee the interest on an issue of bonds for an amount corresponding to about two-thirds of the total cost of the work which is equivalent to 90 per cent of the cost of the sub-structure. At the expiration of the franchise, 50 years, or in the contingency of appropriation of the system, the state would naturally become the owner of the sub-structure. The state would also be entitled to participation in the net profits.

Calculations indicate that the remaining routes, including the first portion of route C, can be carried on without further assistance from the state.

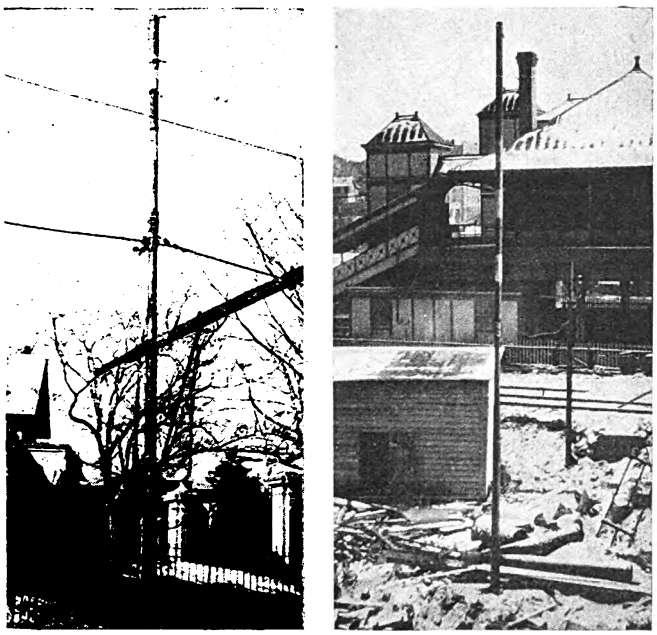
Growth of Population in Rome, 1921-1927

	1921	1927
Rioni (wards of central city)	451,097	477,206
Quartieri (districts) of outer city	152,312	236,751
		5,026
Total	603,409	718,983
Suburban districts	28,205	57,064
Agricultural districts	34,426	54,628
Total exclusive of garrisons	666,100	830,675
Garrisons	25,561	17 444
Total population of Roman district	691,661	848,119
Average population (inhabitants per hectare) of rioni and quartieri, exclusive of garrisons	115	135

Digitized by Google

Long Poles Made by Splicing

DUE to the extension of the Bronx River Parkway under 232nd Street, the foundations of some of the span wire poles used by the Third Avenue Railway System, New York, were removed. Two novel methods of supporting the overhead construction were adopted. One was to support both wires by a horizontal arm attached to the pole on the side opposite the railroad cut. An extension approximately 12 ft. long was made to this pole by means of a malleable iron reinforcing clamp. From the top of the lengthened pole guy wires were attached to support the horizontal arm, as shown in an accompanying illustration. This arm projected back a short distance over the sidewalk and was guyed at that end as well as at the long end.



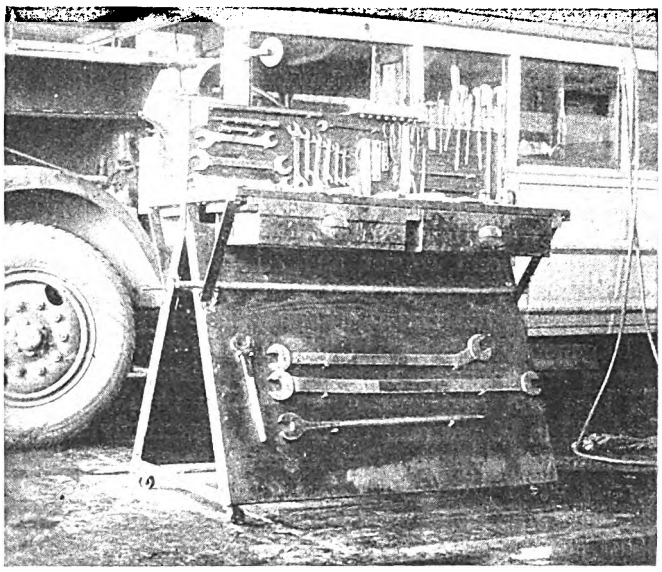
At left—Pole lengthened by splicing to support horizontal arm for attaching trolley wires on Webster Avenue. At right—Extra long pole made by splicing two ordinary poles together with reinforcing clamp

The other method used to support the trolley overhead was the erection of a 60-ft. pole, the foundation of which was in the new cut. To obtain a pole of this length the railway took two ordinary 30-ft. poles and placed one upside down on top of the other, joining them by a malleable iron reinforcing clamp.

Portable Rack for Special Bus Tools*

By Stewart Palmer
Foreman Berea Garage
Cleveland Railway

TO SPEED UP bus inspection a semi-portable tool stand is used at the Berea Road Garage of the Cleveland Railway to hold all special wrenches needed, as well as a supply of nuts, bolts, lamp bulbs and other small items necessary for this kind of work. The stand is placed between two pits where it is readily accessible for the mechanics working in each inspection pit. This material would normally be kept in the stockroom but because



Rack for special bus tools and equipment speeds up the work in garages of the Cleveland Railway

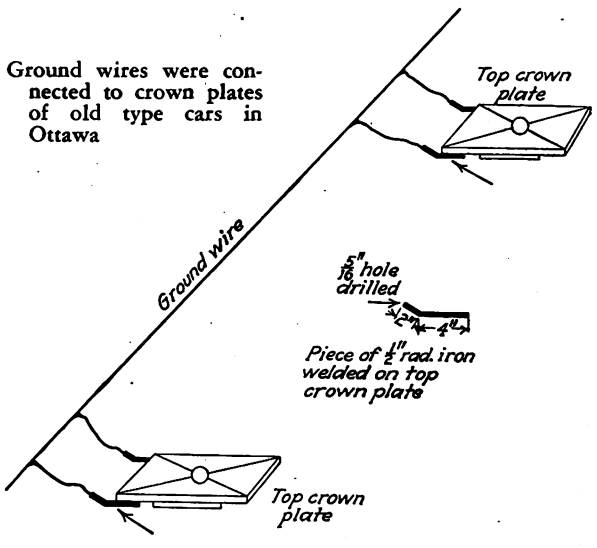
the same work is performed in these two pits continually, it is more economical to place special tools and equipment on the floor. At the close of the inspection period, the rack is moved into the stockroom.

Cars Grounded on Crown Plate*

By J. Munford
Electrical Foreman
Ottawa Electric Railway, Ottawa, Canada

DIFFICULTY has been experienced in Ottawa to keep ground wire connections tight on old type cars, cars frequently being pushed in dead on account of this failure. To overcome this, four pieces of ½-in. round iron 6 in. long were cut and bent at 45 deg. at a distance

Ground wires were connected to crown plates of old type cars in Ottawa



of 2 in. from one end. A $\frac{5}{16}$-in. hole was drilled in the short end and tinned. This iron ground connection was then welded on the long end to the top crown plate, with the tinned holes upward to retain the solder while the taps from the main ground wire were being soldered in place. Since this installation none of these ground connections has given any trouble.

*Submitted in Electrical Railway Journal Prize Contest.

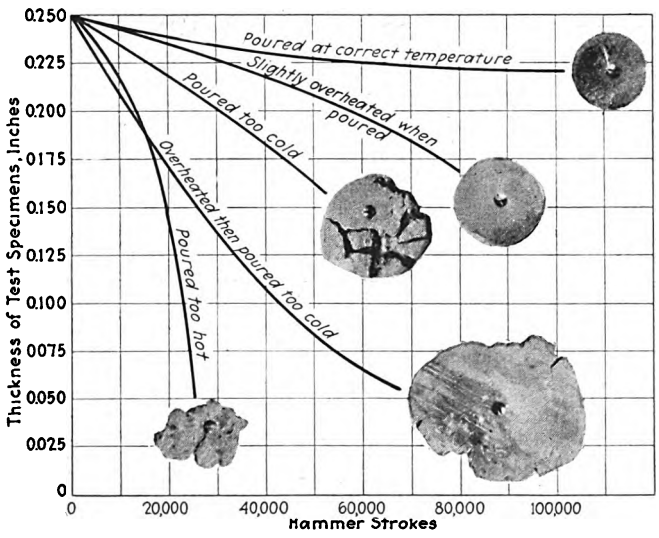
Digitized by Google

Tests Show Importance of Correct Babbitting

By J. S. Dean
Renewal Parts Engineer
Westinghouse Electric & Manufacturing Company

BABBITT metal commonly used for lining bearing shells was originally a composition of 89.3 per cent tin, 3.6 per cent copper and 7.1 per cent antimony. More recently a great variety of bearing metals have been brought out under different trade names.

In general, the various babbitt metals used in railway motors are divided into two distinct classes, known as tin base and lead base alloys. They usually contain from 80 to 90 per cent tin or lead respectively as their fundamental element. Both classes give good results in service when properly handled during the melting and pouring process while babbitting the bearing shells. Most electric railway operators seem to favor the use



Results of hammer tests of babbitt metal poured under various conditions

of the tin base alloy for armature and axle bearings, although a few have tried the less expensive lead base alloy as an experiment with good success.

To show the variety of materials used in some of the well-known babbitt metals, the following table represents five different brands of tin and lead base alloys commonly used:

Composition of Babbitt Metals

	Tin Base Alloy — Per Cent				Lead Base Alloy — Per Cent			
Sample	Tin	Copper	Antimony	Sample	Lead	Copper	Antimony	Tin
(1)	85	7.5	7.5	(1)	64	1	14.4	20.6
(2)	83.0	5.0	12.0	(2)	81.3	1.8	11.4	5.5
(3)	*89.3	3.6	7.1	(3)	76.2	.2	14.4	9.2
(4)	90.0	2.0	8.0	(4)	82.3	.2	16.6	.9
(5)	83.4	8.3	8.3	(5)	79.5	.8	19.5	.2

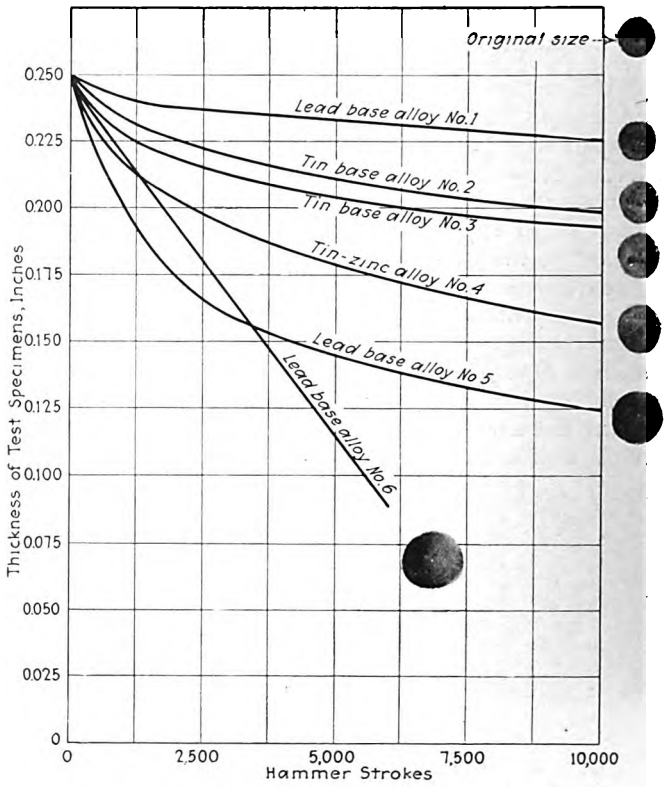
*Original formula of Isaac Babbitt.

The mechanical strength of the two different types of alloy are shown in the following table:

Strength Tests of Babbitt Metals

Class of Alloy	Ultimate Stress — Tension	Ultimate Stress — Compression	Elastic Limit — Tension	Elastic Limit — Compression	Per Cent Elongation in 2 In.	Brinnell Hardness
Tin base.....	11,875	16,800	5,000	7,000	5.5	*30
Lead base....	10,900	14,500	3,200	3,000	1.0	*24

*These tests were made on sample specimens 2 in. in diameter and ½ in. thick



Results of hammer tests of babbitt metal of various compositions

The results of vibration and pounding tests made on a number of sample bearing shells which were babbitt lined, tin and lead base alloys being used, show interesting results. Tests made on bearing shells (tinned before babbitting) show that a tin base alloy resists failure due to pounding and vibration 2½ times better than a lead base alloy. Similar tests made on bearing shells (not tinned before babbitting) show that a tin base alloy resists failure due to pounding and vibration five times better than a lead base alloy. These bearings were subjected to two different tests. In the first test the bearing was mounted in a specially designed hammer machine which pounded the flange of the bearing. In the second test a special vibration testing machine was used which delivered a series of rapid vibrations to the body of the bearing shell.

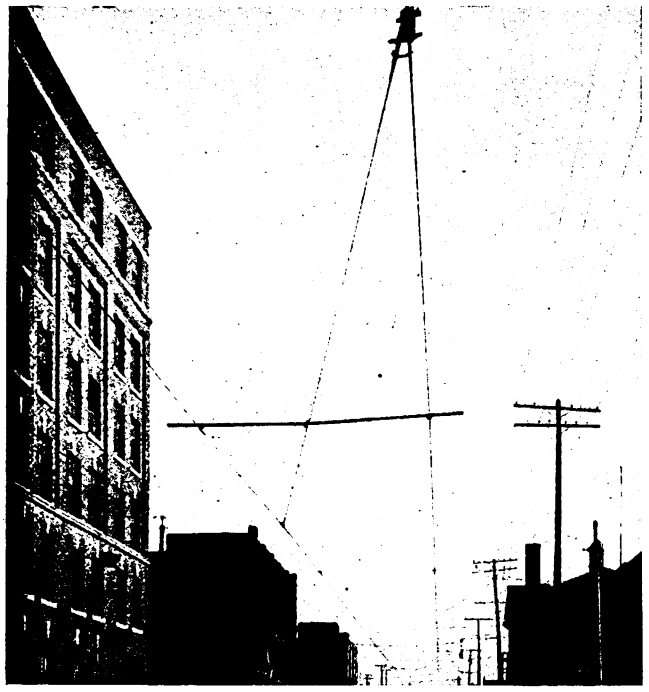
Test pieces of babbitt metal of 1 in. diameter and ¼ in. thickness were prepared and subjected to a series of hammer blows, after which the thickness of the pieces was measured and the corresponding number of strokes recorded. Results of these tests show the importance of pouring babbitt metal at the proper temperature, as may be seen from the accompanying curves.

Results of actual service tests made on railway motor armature bearings lined with an approved grade of tin and lead base alloy show that either class of these babbitt metals will operate satisfactorily in service. The following figures were obtained from actual service bearings:

Service Tests of Babbitt Metals

Kind of Service	Babbitt Lining	Armature Location	Actual Mileage	Maximum Wear
City.....	Tin base	Pinion end	290,000	0.061 in.
City.....	Tin base	Commutation end	290,000	.006 in.
Interurban.	Lead base	Pinion end	240,000	.028 in.
Interurban.	Lead base	Commutation end	240,000	.037 in.
City.....	Tin base	Pinion end	374,900	.075 in.
City.....	Tin base	Commutation end	374,900	.025 in.

Digitized by Google



Temporary crossover used by the Cleveland Railway is easily and cheaply installed

Economical Overhead for Temporary Crossovers*

By Angus G. Scott
Assistant Superintendent of Overhead Lines
Cleveland Railway

ERECTION of overhead crossings over portable track crossovers is facilitated at Cleveland by the use of a 2½ in. x 1½ in. x 12 ft. board, which acts as an intermediate span wire. This board is provided with three barn hangers which move freely back and forth. The first step in erecting a temporary crossover is to install a frog over each switch. The frogs are then connected by a short piece of $\frac{5}{16}$-in. or $\frac{3}{8}$-in. stranded span wire which is prevented from sagging and is kept in alignment by the hanger on the board. Reclaimed ears, frogs and wire are used in the installation of such a temporary overhead crossover. This device can be installed in about 30 minutes at a saving of approximately $3 in labor costs alone, as compared with the old method of installing overhead crossovers.

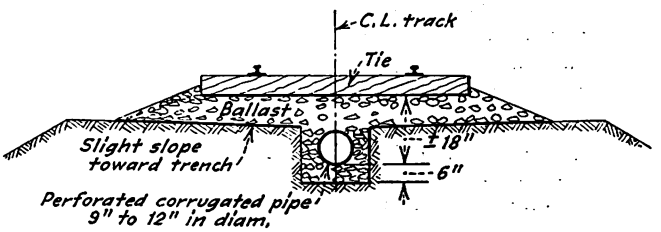
Center Subdrainage System Reduces Track Maintenance Cost

DRAINS placed directly under the center of the electric railway track of the East Bay division, Southern Pacific Company, Berkeley, Cal., have lessened track maintenance work and insured better riding qualities. The installation of these drains is part of an extensive improvement program which has been in progress for some time past. The project involves the complete reconstruction of the track using 90-lb. T-rail with creosoted ties on rock ballast.

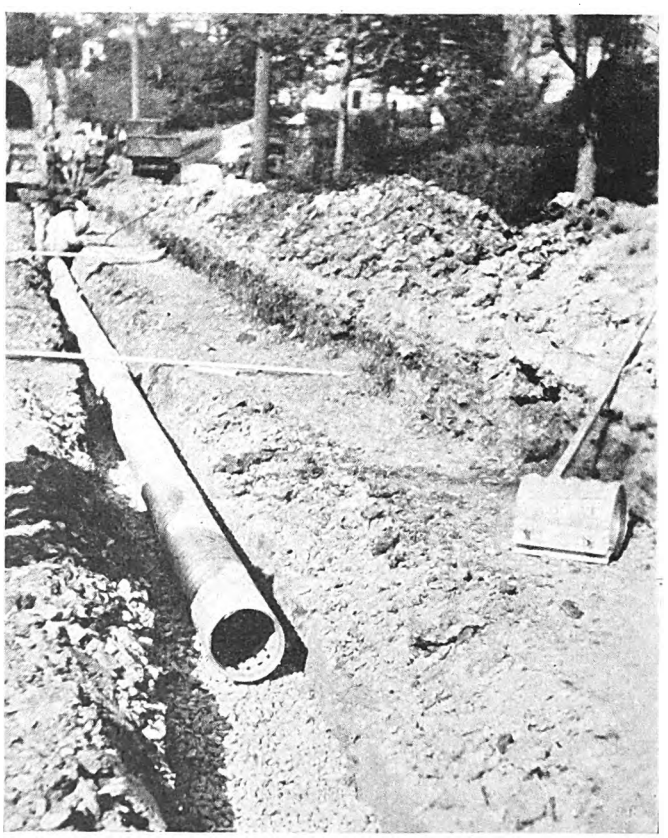
Poor drainage conditions on the old track had been a fruitful cause of low and pumping joints, bumpy surface and heaved pavement. To safeguard against such conditions on the new construction, a system of center subdrainage was designed. Placing of the drains under the center of each track is believed to have several advantages over the old method of placing subdrains to the side of and between tracks. By placing the drains in the center, sloping the subgrade slightly toward the trench and using a pervious backfill, one line of drain is sufficient to remove water quickly before it has a chance to lessen the bearing power of the soil. A drain so placed stabilizes the soil supporting the track and its weight of traffic.

However, successful use of this design demands a drain of considerable strength if it is to bear without breakage the shock and impact of traffic. Even where it is desired to lower the water table and the drain is placed at such a depth that the impact factor becomes of less consequence than the dead load, a non-crushable drain of continuous construction which will not disjoint in unstable and shifting soils is necessary to avoid costly replacement work.

The trench was excavated to a width of from 9 to 12 in. greater than the diameter of the pipe, to permit careful tamping of the rock backfill around the pipe. The trench depth was maintained at 6 in. below



Drainage system used for open track on suburban lines



Perforated iron pipe on a 6-in. layer of coarse rock used for track drainage in Berkeley, Cal., by East Bay division of Southern Pacific Company

*Submitted in Electric Railway Journal Prize Contest.

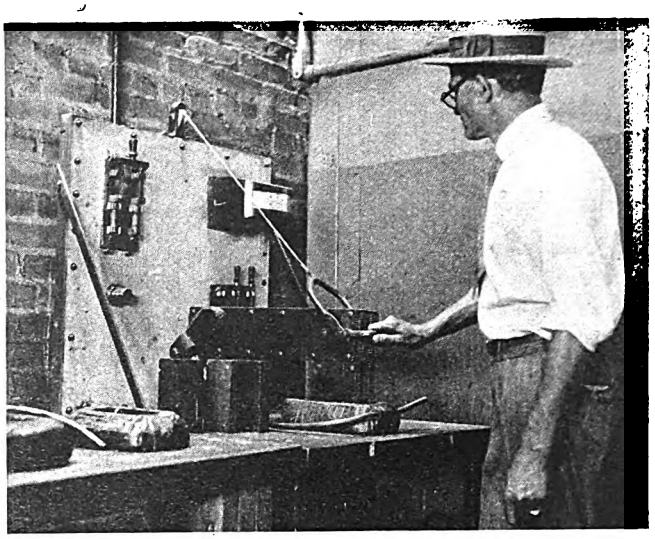
Digitized by Google

the flow line to provide for a bed of crushed rock below the pipe. The flow line was kept at approximately 18 in. below the ties, varying somewhat because of the grade. Where it was necessary to lower the water table this depth was increased to any desired depth for which it was possible to secure an outlet. The rock backfill was carried to the top of the trench, where it became integral with the ballast section. It is considered to be highly essential that rock backfill be used to the top, in order that direct and rapid interception of run-off, rather than slow percolation through soil, will result. The surface of the subgrade was sloped slightly toward the trench for the same reason. In general it was decided to install a drainage system conforming to this design over originally swampy land, through cuts or side-hill sections, or where adobe pockets in the original fills were impounding water.

Testing of Field Coils*

By C. B. Hall
Chief Clerk Mechanical Department
Virginia Electric & Power Company, Norfolk, Va.

SIMPLE and effective apparatus for testing field coils has been developed in the shops of the Virginia Electric & Power Company, Norfolk, Va. A transformer or "growler" was assembled for this purpose by the electric shop foreman. A table, measuring 30x30 in., was made of 2x2-in. angle iron and topped with a piece of 1½-in. hickory. The table back is of transite board on which is mounted a 30-amp. safety switch, a 50-amp. a.c. ammeter and knife switches for short circuiting the ammeter and selecting the different number of turns in the transformer winding. The core is made of No. 20 gauge sheet steel, the cross section being 4x5 in., while the inside of the rectangle measures 9½ in. vertically and 12 in. horizontally. The top horizontal member is hinged and counter-weighted so that it may be easily moved up and down providing free space for putting a field coil in place for test and at the same time making it easy to close the iron circuit during the testing. The front vertical leg is flush with the surface of the table. A removable piece represents the portion of the iron circuit between the short vertical leg and the moving horizontal member. The primary winding is wrapped around the portion of the iron under the table, No. 10 A.W.G. double cotton-covered wire being used. The winding has 180 turns, with taps at 60 and 90 turns



Assembly of field coil testing apparatus

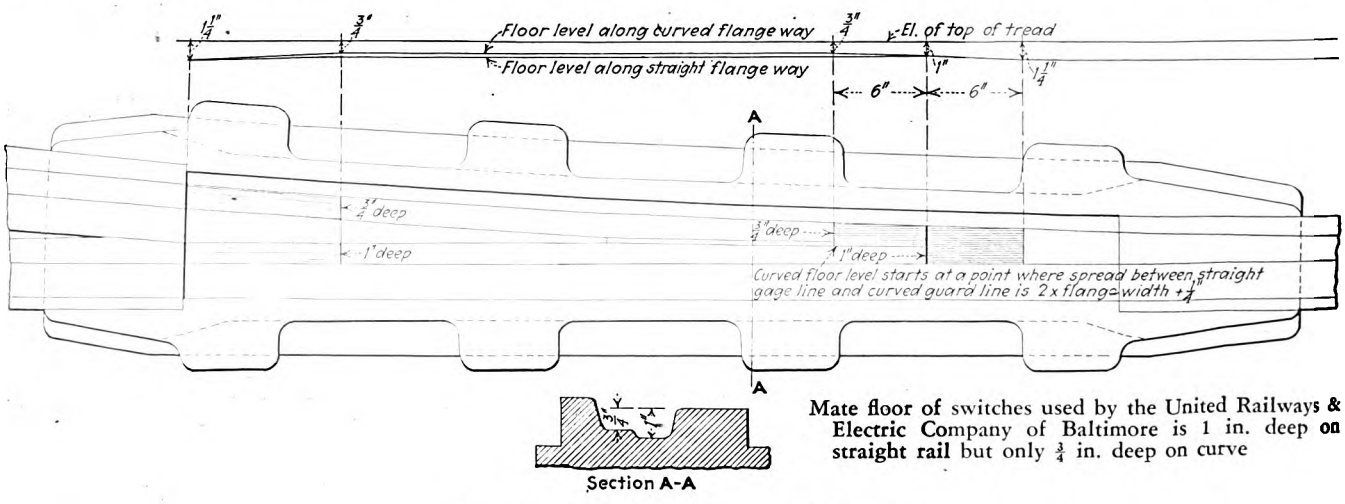
leading to knife switches. The 90-turn winding is used for regular testing, the 60-turn winding for burning out a shorted turn quickly, and the 180-turn winding when repairing a shorted coil. Field coils are tested by placing them on the table and closing the iron circuit of the transformer. The safety switch is then closed, energizing the transformer. The knife switch connected across the ammeter is then opened. If the field coil is without shorted turns, the ammeter will indicate a current of exactly the same value as it does without a field coil on the transformer. If the field coil has any shorted turns, the current will be greater, the degree of short circuit being indicated by ammeter reading. It is for this reason a switch, short circuiting the ammeter, is used because a badly shorted coil will show an ammeter reading in excess of 50 amp. This apparatus has saved time and labor by the detection of defects at an early stage.

*Submitted in Electric Railway Journal *Prize Contest.*

Redesigned Mate Floor Prevents Derailments*

By W. P. Davis
Roadmaster United Railways & Electric Company, Baltimore, Md.

AT TURNOUTS where the principal car movement is on a straight track and where floor bearing mates are used, a groove is soon worn in the floor on the straight side. This tends to cause derailments with car



Mate floor of switches used by the United Railways & Electric Company of Baltimore is 1 in. deep on straight rail but only ¾ in. deep on curve

Digitized by Google

movements on the curve side. To avoid this trouble the United Railways & Electric Company of Baltimore has redesigned its switches so that the floor on the straight side is made 1 in. deep and the flanges do not touch, while on the curve side the floor is only ¾ in. deep. The approach to this higher floor is made at such a point that the car wheels will have already been guided into position by the switch tongue before the flanges touch the high floor. This design was adopted several years ago for wheel flanges 1¼ in. wide and 34 in. deep, and proved very satisfactory.

Shunting Motors to Obtain Greater Speed

By R. S. Beers
Transportation Engineering Department
General Electric Company, Erie, Pa.

SUBSTANTIAL increase in the operating speed of existing street cars can sometimes be simply and cheaply accomplished by shunting the motors with non-inductive shunts. This has been tried successfully in several cities. It has been done on a considerable number of equipments by the Key System Transit Company and the United Railways & Electric Company of Baltimore. Where the operation includes considerable suburban running, with relatively infrequent stops, a material increase in schedule can be accomplished; the method is of little or no value, however, if the stops are close to each other.

The recommended practice is to accelerate the car on full field and, after all the resistance has been cut out of the circuit by the controller, to shunt the motors. As there is a considerable increase in current when changing from full field to shunt field, it is customary to have the motor current govern the change through the intermediary of a current relay. This method simplifies the control devices, so that they may be added readily to almost any existing control equipment.

The material used includes one ME-67 field shunting switch, weighing about 105 lb., one EW resistor, weighing about 35 lb., and cable and details. The ME-67 switch is used for either two or four-motor equipments, and includes the governing relay as an inherent part of the device. The EW resistor is used as a shunt for the motor field; all the shunts for either a two-motor or a four-motor equipment are included in the one EW resistor. With a Type K controller it is necessary to add a control finger, and with remote controls it is necessary to add an interlock to one or two of the contactors.

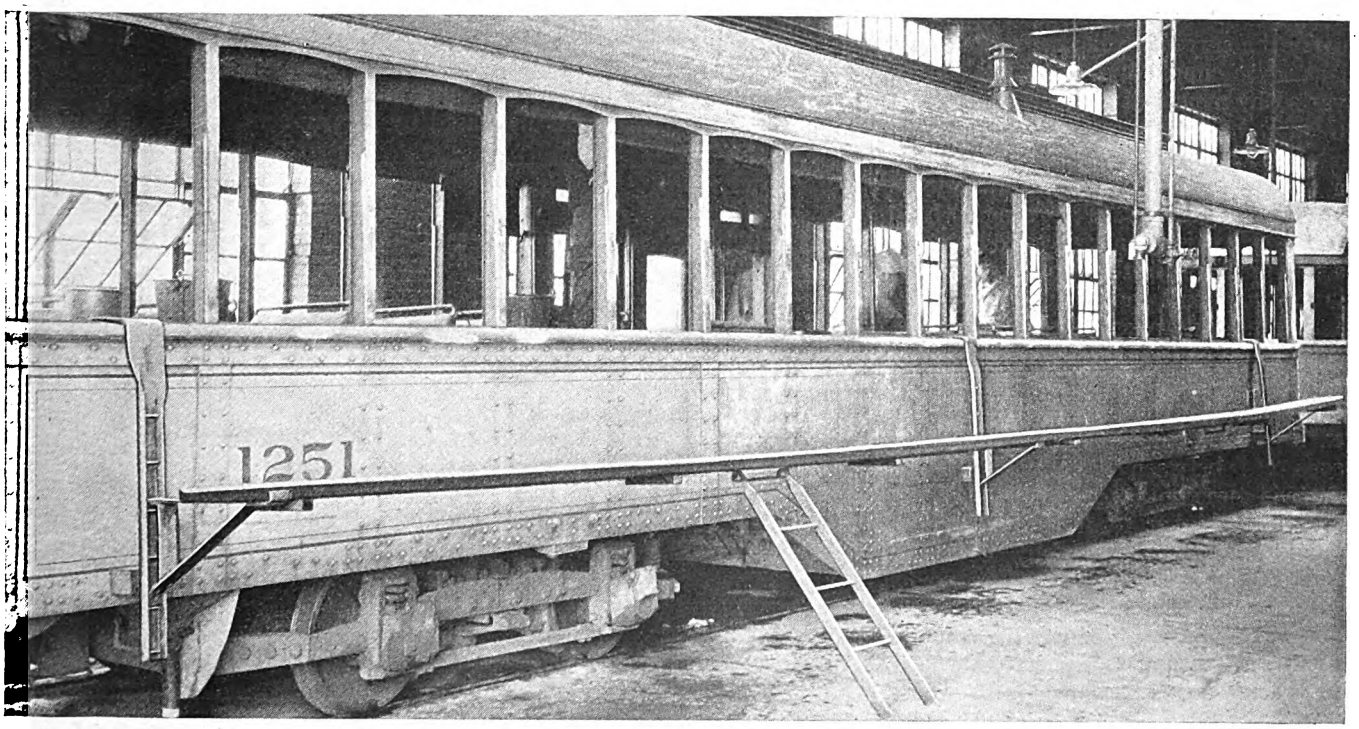
In general the method cannot be applied to advantage to non-commutating pole motors such as the GE-67, GE-80 and W-101. The conditions of operation, car weights, commutation of motors, etc., vary so much that no one can recommend field shunting with certainty of success in every instance. It is recommended that one equipment be installed and an actual test used to ascertain whether or not the method is successful.

Adjustable Scaffold for Car Washing*

By R. C. Sohl
Engineer Mechanical Department Cleveland Railway

HORSES and planking assembled to form a scaffold to reach the upper parts of the car, in the wash house of the Cleveland Railway, have been replaced by a set of brackets which hang from the window sills of the car. These brackets are constructed from 3-in. channel iron, bent to the shape of the window sill. They are adjustable by means of sets of horizontal rivets. The parts which rest on the window sill are covered with canvas and leather as a protection to the woodwork. This new equipment not only saves valuable space occupied by the horses formerly used, but also saves much of the

**Submitted in* Electric Railway Journal *Prize Contest.*



Brackets suspended from the windows support platform used in car washing or painting in the shops of the Cleveland Railway

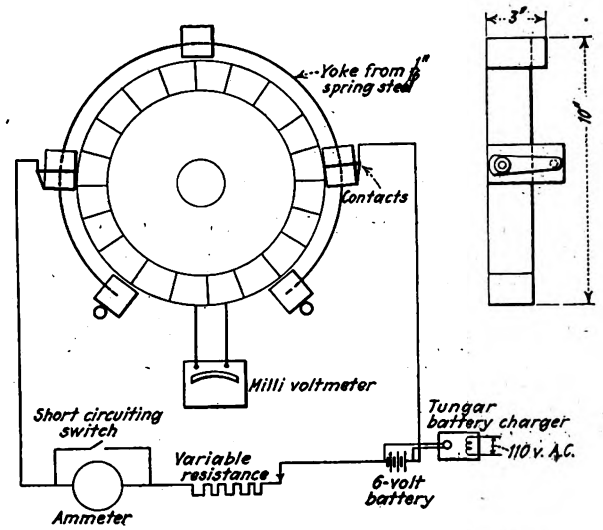
Digitized by Google

time required to set them up. Safety has been increased considerably. Whereas the old equipment rested on the floor and was unstable on a soapy concrete, the suspended scaffold eliminates the danger of slipping. The cost of a bracket is about $2.50. Four are necessary for one side of a 50-ft. car.

Test for Partially Open Circuit*

By H. J. Beadle, E.E.
Dallas Railway & Terminal Company

READY detection of cracked or partially cracked coil leads has been attained by an additional test recently installed by the Dallas Railway & Terminal Company. A yoke which is made of $\frac{1}{16}$-in. spring steel is supported



Circuit arrangement in making open circuit test

on five fiber blocks and will fit the commutator of any armature from 25 to 65 hp. This steel yoke is therefore insulated from the bars and supports the leads which carry the current to the commutator while testing. This current is supplied from a 6-volt storage battery and is varied by means of a rheostat. After a current of about 6 amp. has been attained, the ammeter can be short circuited and thus be protected during a time when a great many armatures are being tested. The tungar battery charger is connected to a 110-volt a.c. circuit and in this way the battery is kept in good condition at all times. It is important to keep the battery fully charged so as to insure a constant current while testing. The milli-voltmeter is used to get the voltage drop across each pair of bars and unless the voltages are between bars exactly alike there is something wrong with the armature. A higher reading than normal would indicate a partially open or broken lead and a lower reading would indicate a short between bars. This test is adaptable to modern high-speed motors with small wires where broken or cracked leads become more serious.

**Submitted in* Electric Railway Journal *Prize Contest.*

Belt Conveyor for Loading Concrete Mixer*

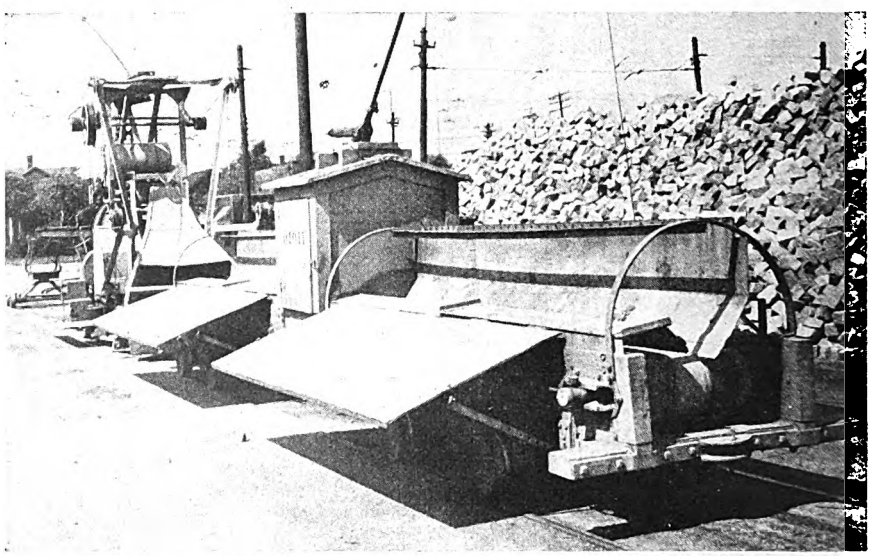
By E. B. Spenzer
Way Department Cleveland Railway, Cleveland, Ohio

TIME and labor are saved in loading material into the skip of a concrete mixer by using a belt conveyor loading device which has been developed by the Cleveland Railway. The method of loading by hand or wheelbarrow resulted in waste of time as the men crowded around the skip. Trucking proved equally costly, and frequently was impracticable when the mixer was placed in an inaccessible location.

With the belt conveyor connected to the mixer by a long draw bar, the material is shoveled on the conveyor from the side where it has been unloaded in a continuous pile from the work trains. One man stands at the skip and puts in the cement from the sacks. He also gages the amount of sand and gravel that the conveyor throws into the skip and when there is enough material for a batch, he blows a whistle as a signal for the men to stop shoveling on to the conveyor. These men stand at intervals along the conveyor for a distance of 30 ft. and have ample room in which to work. In the time required to mix a batch of concrete, the skip of the mixer is loaded. Thus no time is lost.

This conveyor is built on a low frame, 30 ft. long, mounted on two sets of small trucks. An endless belt runs horizontally along the car over two pulleys, one at each end. Guide pulleys are spaced at 3-ft. intervals and at a 45-deg. angle to tilt up the edges of the belt. Inside the edge of the belt and projecting lip are two side boards which prevent the material from going off the belt. Two steel aprons are on the side of the conveyor from which the material is loaded. These extend to within 1 ft. of the pavement and prevent the material from being thrown on to the surface track. The conveyor is operated by a small motor in the center of the car.

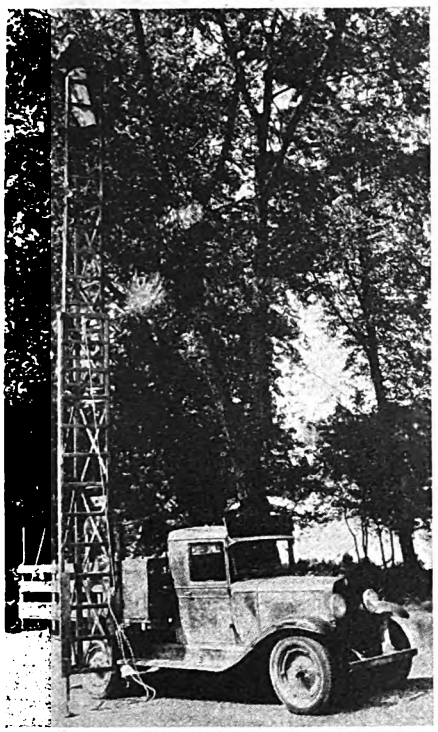
The number of men required for the complete job of mixing is reduced from 24 to 11, while the speed of mixing is increased by 20 per cent.



Belt conveyor used by Cleveland Railway for loading concrete mixer saves 53 per cent in labor

Digitized by Google

NEW PRODUCTS for the Railways' Use

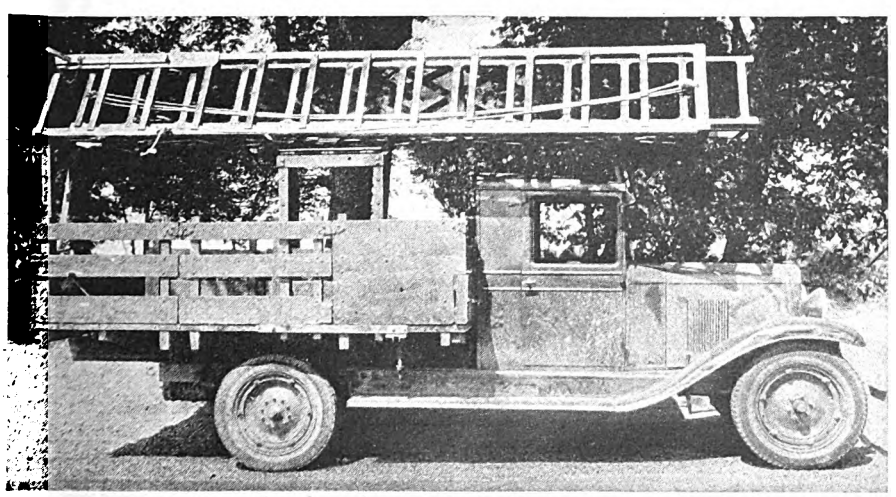


Light-weight convenient tower ladder developed for use on motor trucks

Triangular Tower Ladder

FOR light work of various kinds, a triangular tower ladder has been developed by J. R. McCardell & Company, Trenton, N. J. It has been designed for use with a small motor truck equipped with a steel supporting frame.

The ladder is placed erect at the side of the truck body, and is held firmly in position by the supporting frame and a resting leg attached to the outside post. The length of the resting leg can be adjusted to obtain a solid support. With an outside dimension of 26 in., the ladder weighs approximately 250 lb., and attains a height of 25 ft. from the ground to the platform. The outside section is equipped with 1½-in. steel rollers running in grooves of the inside section, which is raised and lowered by means of a block and fall with ½-in. rope. The ladder can be detached from the frame by removal of a pin.

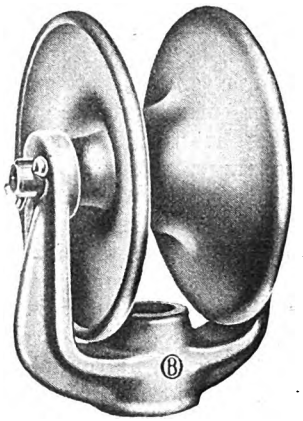


Telescoped sections of the ladder are easily carried on small motor truck

Cable Roller for Stringing Feeder Wire

DAMAGE to feeder wire brought about by contact with crossarms during stringing is avoided by the use of a feeder cable roller, a new product of the Ohio Brass Company, Mansfield, Ohio. In this device attention has been paid particularly to ease of application and substantial construction. The yoke of the roller is provided with a hole tapered to correspond with the threaded portion of a standard insulator pin, over which it is slipped while in use. By this means, no special attachments are necessary. All parts are made of Flecto malleable iron, hot-dip galvanized, with the exception of the ¾-in. hardened-steel axle. The wheel has an over-all diameter of 6½ in.

In operation, the roller is placed on a pole crossarm pin and the wire is fed over it from one crossarm to another for as long a distance as may be desired. The wire is then lifted from the roller, which is removed from the pin, and the insulator installed. The rollers are then moved ahead on the job and the operation repeated. They are made to give long service, and accommodate all sizes and weights of feeder wire.



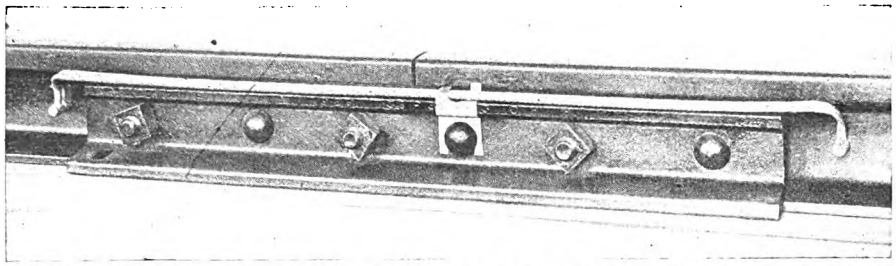
Cable roller for crossarm facilitates stringing feeder wire

Combination Steel and Copper Rail Bond

OWING to the success obtained with strand steel bonds for automatic block signal circuits on the Pennsylvania Railroad, it was decided to determine if the signal bond, or a modification of it, would be adequate for the propulsion current for the 11,000-volt single-phase alternating current system used on that property. The American Steel & Wire Company made numerous experiments and finally developed a bond conductor which proved suitable.

It was necessary to develop a bond which would carry safely 400 amp. at 25 cycles without undue heating. It was also necessary to develop a bond having a relatively low a.c.-d.c. resistance ratio. Experiments were conducted with so-called mixed strands having different arrangements of copper and steel wires. In carrying out this work, it was not only essential to satisfy the alternating

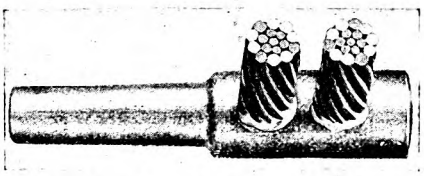
Digitized by Google



Rail bond especially designed for 11,000-volt single-phase a.c. railroad electrification

current impedance characteristics and current carrying capacity, but to develop a bond conductor which possessed the proper mechanical strength, and which was relatively inexpensive.

The bond, as finally developed, is quite simple and has two strands, each having ten copper and seven steel wires, arranged as shown in an accompanying illustration. Terminals are of soft steel and are tapered to make a drive fit into $\frac{3}{8}$-in. holes in the rail web. The terminal is the same as for signal bonds which are very widely used throughout the country. The two strands are flash butt welded to the terminals simultaneously. This weld is very strong and the heat of welding is so localized that the strand is not affected thereby.

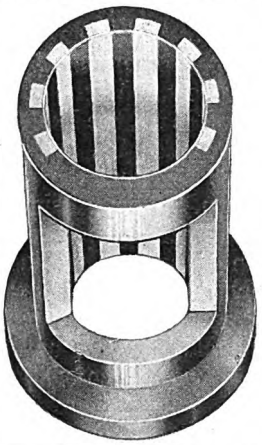


The bond consists of two strands each having ten copper and seven steel wires, arranged with seven copper wires in the center and three copper and all the steel wires on the outside

In order to give the bond an appearance of all steel, the steel wires are galvanized and the copper wires are tinned. The construction of the bond with two parallel conductors serves two purposes: the alternating current carrying capacity is increased over what it would be with a single conductor of cross-section twice the size; in case of failure from fatigue or outside mechanical injury, the likelihood of both strands breaking simultaneously is remote. As the bond is completely exposed for inspection, partial failures can be detected readily.

The bonds were put under laboratory test where it was found that 72 deg. C. rise in temperature resulted from a load of 400 amp. at 25 cycles. In the test piece terminal pins were driven into two pieces of rail.

Bimetallic Armature Bearing

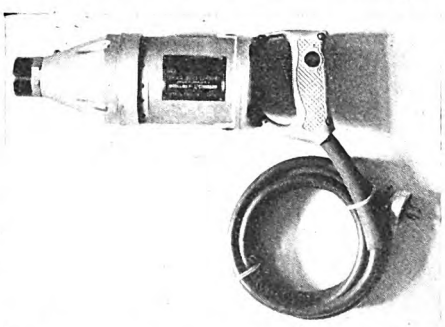


In this type bearing the contact surface is a combination of bronze and lead base babbit strips

REDUCTION in the amount of babbitt metal required is an advantage claimed for a new bimetallic armature bearing developed by the National Bearing Metals Corporation. In this bearing, eight slots have been cut in the bronze parallel to the axis of the armature shaft, thus giving a combination contact of bronze and lead base babbitt metal. During tests of these bearings, 160,000 miles of service was obtained without serious wear on the bearing.

Portable Electric Hand Tool

A SINGLE power unit arranged to drive a variety of hand tools has been developed by the J. G. Brill Company. This new device is known as the Brill Multi-tool. It weighs only $5\frac{1}{4}$ lb., and particularly lends itself to convenient storage of attachments. It is specially adapted to the transportation field. More than fifteen major operations and almost unlimited minor functions can be accomplished by the use of this one power unit. These include drilling, grinding, buffing, sanding, sawing, nut setting, screw driving, planing, filing, valve grinding, reaming, under cutting, nibbling, shearing and mixing.

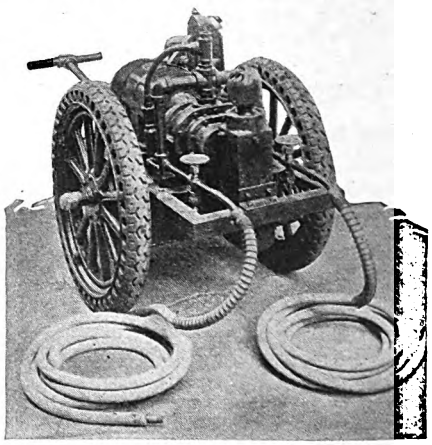


Electric tool adaptable for many uses weighs only $5\frac{1}{4}$ lb.

In the automotive field this tool, in addition to valve grinding and carbon removing, can also be used for body cleaning and polishing, tire and battery repairing, and metal polishing.

Rail Preheater Made More Compact

GREATER compactness, lightness and suitability for joint maintenance are features of a rail preheater developed by the Metal & Thermit Corporation. Either kerosene or gasoline is used as fuel. This is mixed with air from a positive pressure blower driven directly by a motor. Its air intake is through a rotating air filter or strainer located high enough above the ground to avoid the dust and grit always found around construction work. The fuel tank is of ample capacity and is underslung beneath the chassis which is mounted on Ford cushion-tire wheels.



Compact preheater for making Thermit joints

This machine is built in two models. One uses a 550-volt d.c. motor. The other is driven by a 220-volt d.c. motor connected in series with standard space heaters which thoroughly warm the incoming air. It is stated that this gives more economical operation, as it is easier to maintain the fuel in suspension in the preheated air.

Digitized by Google

Monthly and Other Financial Reports

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Market Street Railway, San Francisco, Cal.					
June, 1930	743,277	646,615a	.....	96,662	42,297
June, 1929	779,474	658,763a	.....	120,711	61,314
12 Mo. end June, 1930	9,508,732	7,976,986a	.....	1,531,746	848,573
12 mo. end. June, 1929	9,585,384	8,205,288a	.....	1,380,096	749,242
Northwestern Pacific R.R., San Francisco, Cal.					
May, 1930	485,027	446,844	35,854	2,243	*2,800d*
May, 1929	534,895	423,138	38,237	73,438	73,597d
5 mo. end. May, 1930	2,065,839	2,175,458	180,856	*290,704*	*313,042d*
5 mo. end. May, 1929	2,188,737	2,196,811	191,182	*199,385*	*208,873d*
Capital Traction Company, Washington, D. C.					
June, 1930	340,623	245,606	26,155	74,103	40,884
June, 1929	359,494	255,072	27,406	82,420	49,097
6 mo. end. June, 1930	2,125,179	1,520,047	165,434	452,200	269,091
6 mo. end. June, 1929	2,201,290	1,529,901	173,578	512,768	330,298
Jacksonville Traction Co., Jacksonville, Fla.					
May, 1930	89,731	71,286	8,820	9,061	.....
May, 1929	98,918	77,774	9,215	11,349	.....
12 mo. end. May, 1930	1,106,580	903,838	106,919	89,432	*66,663*
12 mo. end. May, 1929	1,177,796	951,547	106,664	113,242	*47,682*
Honolulu Rapid Transit Co., Honolulu, T. H.					
May, 1930	88,437	50,810	8,819	31,008	19,704
May, 1929	88,382	51,892	7,932	29,569	18,346
5 mo. end. May, 1930	432,827	257,161	44,096	138,095	78,392
5 mo. end. May, 1929	442,981	255,608	50,395	142,578	86,461
Chicago Surface Lines, Chicago, Ill.					
June, 1930	4,766,687	3,835,838a	.....	930,848	776,880g
June, 1929	5,118,795	4,015,900a	.....	1,102,899	848,376g
Louisville Railway, Louisville, Ky.					
4 mo. end. Apr., 1930	1,770,201	1,318,286a	.....	451,915	.....
12 mo. end. Dec., 1929	5,263,949	4,111,045a	.....	1,152,904	.....
United Railways & Electric Co., Baltimore, Md.					
June, 1930	1,332,275	916,851	126,157	301,565	35,318e
June, 1929	1,368,136	941,037	133,435	313,638	33,710e
6 mo. end. June, 1930	8,495,733	5,791,821	832,822	1,939,299	299,082e
6 mo. end. June, 1929	8,390,353	5,766,486	819,136	1,893,889	195,687e
Department of Street Railways, Detroit, Mich.					
June, 1930	1,787,953	1,446,482	65,090	285,834	159,027
June, 1929	2,193,665	1,704,344	62,422	437,112	296,727
12 mo. end. June, 1930	24,338,810	19,473,857	766,462	4,227,336	2,503,598
12 mo. end. June, 1929	26,329,072	20,888,667	754,745	7,872,689	3,130,286
Eastern Massachusetts Street Railway, Boston, Mass.					
June, 1930	619,456	408,468	26,824	194,018	28,672
June, 1929	685,474	434,576	30,658	241,556	69,138
6 mo. end. June, 1930	4,089,923	2,565,349	181,441	1,402,961	345,916
6 mo. end. June, 1929	4,437,488	2,700,240	199,581	1,648,727	537,689
Twin City Rapid Transit Co., Minneapolis, Minn.					
3 mo. end. June, 1930	3,019,470	2,226,077	.....	793,392f	211,426
3 mo. end. June, 1929	3,249,703	2,420,057	.....	829,645f	223,887
6 mo. end. June, 1930	6,598,966	4,766,007	.....	1,832,958f	645,037
6 mo. end. June. 1929	7,013,530	5,086,337	.....	1,927,192f	686,923
Kansas City Public Service Company, Kansas City, Mo.					
June, 1930	656,292	562,398a	.....	93,393	6,396h
June, 1929	713,507	587,000a	.....	126,506	41,959h
6 mo. end. June, 1930	4,279,230	3,577,378a	.....	701,852	234,288h
6 mo. end. June, 1929	4,518,265	3,637,842a	.....	880,423	405,261h
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
May, 1930	79,126	60,712	4,800	17,953	*13,182*
May, 1929	84,881	57,674	7,840	23,075	*9,974*
5 mo. end. May, 1930	411,851	317,177	24,000	96,157	*59,443*
5 mo. end. May, 1929	430,636	308,612	39,200	95,531	*64,363*
Brooklyn-Manhattan Transit Corporation, New York, N. Y.					
June, 1930	5,070,028	3,231,745	359,998	1,543,947	776,675
June, 1929	4,168,000	2,741,014	213,037	1,346,674	603,523
12 mo. end. June, 1930	60,700,981	39,786,537	4,001,506	17,774,285	8,494,218
12 mo. end. June, 1929	48,586,548	31,256,534	3,304,037	15,073,622	6,518,373
Brooklyn & Queens Transit Corporation, New York, N. Y.					
June, 1930	1,968,238	1,478,334	125,622	381,037	257,482
June, 1929	2,059,234	1,661,608	82,283	343,224	216,693
12 mo. end. June, 1930	23,589,180	18,386,370	1,389,324	4,065,018	2,563,546
12 mo. end. June, 1929	24,142,066	19,851,748	1,261,034	3,296,208	1,759,252
Hudson & Manhattan R.R., New York, N. Y.					
June, 1930	989,627	499,396a	.....	490,231	154,985
June, 1929	1,006,646	508,250a	.....	498,396	162,264
6 mo. end. June, 1930	6,252,254	3,105,535a	.....	3,146,718	1,137,836
6 mo. end. June, 1929	6,286,632	3,161,901a	.....	3,124,730	1,108,429
Interborough Rapid Transit Company, New York, N. Y.					
June, 1930	5,832,071	3,815,405	212,325	1,804,339	*218,727j*
June, 1929	5,725,994	3,452,601	189,726	2,083,666	*48,761*
12 mo. end. June, 1930	72,747,907	45,401,437	2,522,435	24,824,034	*2,155,077j*
12 mo. end. June, 1929	69,735,730	42,344,462	2,393,735	24,997,532	3,007,900
Long Island Railroad, New York, N. Y.					
May, 1930	3,346,650	2,256,980	285,483	802,990	632,246d
May, 1929	3,569,669	2,358,440	265,585	947,471	772,092d
5 mo. end. May, 1930	15,124,693	11,361,755	814,088	2,944,584	2,202,931d
5 mo. end. May, 1929	15,506,699	11,300,190	752,473	3,443,398	2,701,924d
New York Railways, New York, N. Y.					
May, 1930	486,467	422,715a	.....	63,752	*8,003b*
May, 1929	541,163	451,918a	.....	89,245	27,911b
12 mo. end. May, 1930	2,269,863	2,038,271a	.....	231,592	*132,187b*
12 mo. end. May, 1929	2,534,352	2,215,574a	.....	318,778	*34,576b*
Staten Island Rapid Transit Co., New York, N. Y.					
May, 1930	214,848	159,605	17,000	38,243	25,183d
May, 1929	270,744	178,863	17,000	74,881	37,025d
5 mo. end. May, 1930	976,943	758,986	86,500	129,885	95,938d
5 mo. end. May, 1929	1,178,115	864,257	89,000	224,847	40,262d
Third Avenue Railway System, New York, N. Y.					
June, 1930	1,483,592	1,221,475a	.....	262,117	45,078
June, 1929	1,527,603	1,311,997a	.....	205,606	*4,714*
12 mo. end. June, 1930	17,618,574	14,088,315	1,155,437	2,374,821	*199,460*
12 mo. end. June, 1929	17,880,641	14,453,412	1,154,847	2,272,382	*286,933*
New York State Railways, Rochester, N. Y.					
3 mo. end. Mar. 1930	2,229,579	1,983,406a	.....	276,963	*95,673*
3 mo. end. Mar. 1929	2,556,175	1,920,934a	.....	577,266	200,611
Philadelphia Rapid Transit Company, Philadelphia, Pa.					
3 mo. end. June, 1930	13,423,866	9,946,908a	.....	3,711,646	*58,864*
3 mo. end. June, 1929	14,255,944	10,748,208a	.....	3,836,208	10,576
6 mo. end. June, 1930	27,254,524	20,520,045a	.....	7,170,926	*157,981*
6 mo. end. June, 1929	28,441,136	21,546,476a	.....	7,536,182	*109,792*
Galveston-Houston Electric Ry., Houston, Tex.					
May, 1930	41,686	25,342	2,603	13,740	.....
May, 1929	49,181	29,271	2,565	17,343	.....
12 mo. end. May, 1930	552,309	315,903	32,595	204,003	*65,653*
12 mo. end. May, 1929	617,174	347,172	31,665	238,336	*32,508*
Houston Electric Company, Houston, Tex.					
May, 1930	262,653	171,687	23,281	67,684	.....
May, 1929	287,354	173,236	25,530	88,588	.....
12 mo. end. May, 1930	3,292,401	2,063,386	262,562	985,458	597,837
12 mo. end. May, 1929	3,383,455	2,086,639	287,781	1,009,033	600,635
Pacific Northwest Traction Co., Seattle, Wash.					
May, 1930	79,715	56,384	4,015	19,314	.....
May, 1929	76,362	60,866	4,157	11,338	.....
12 mo. end. May, 1930	994,661	703,935	55,176	235,548	120,728
12 mo. end. May, 1929	889,408	749,670	53,215	86,521	*37,909*
Calgary Municipal Railway, Calgary, Alta.					
5 mo. end. May, 1930	425,934	282,585	.....	.....	11,696
5 mo. end. May, 1929	.....	.....	.....	.....	35,971
Lethbridge Municipal Railway, Lethbridge, Alta.					
4 mo. end. Apr., 1930	18,872	15,546	.....	3,326	*7,016*
4 mo. end. Apr., 1929	.....	.....	.....	.....	*5,279*
British Columbia Electric Railway, Vancouver, B. C.					
April, 1930	1,213,993	892,823a	.....	321,170	.....
April, 1929	1,205,482	816,975a	.....	388,507	.....
10 mo. end. Apr., 1930	12,324,706	8,640,255a	.....	3,684,451	.....
10 mo. end. Apr., 1929	14,748,835	10,804,611a	.....	3,944,224	.....
British Columbia Electric Railway, Vancouver, B. C.					
May, 1930	1,233,292	748,287	.....	485,005	.....
May, 1929	1,165,279	653,037	.....	512,242	.....
11 mo. end. May, 1930	13,558,000	7,922,053	.....	5,635,947	.....
11 mo. end. May, 1929	12,914,845	7,050,820	.....	5,864,025	.....
Guelph Radial Railway, Guelph, Ont.					
6 mo. end. Apr., 1930	47,641	42,449	514	4,678	*13,655*
6 mo. end. Apr., 1929	.....	.....	.....	.....	*12,337*
Ontario Hydro-Electric Railways, Essex District, Windsor, Ont.					
6 mo. end. Apr., 1930	567,633	469,070	2,828	95,734	*88,971*
6 mo. end. Apr., 1929	.....	.....	.....	.....	56,562
Regina Municipal Railway, Regina, Sask.					
5 mo. end. May, 1930	190,552	125,454	.....	.....	*12,015*
5 mo. end. May, 1929	.....	.....	.....	.....	18,528
Saskatoon Municipal Railway, Saskatoon, Sask.					
5 mo. end. May, 1930	179,663	118,739	7,057	.....	*3,979*
5 mo. end. May, 1929	.....	.....	.....	.....	17,802
Mexico Tramways, Mexico City, Mex. c					
May, 1930	859,600	927,280a	.....	*67,680*	.....
May, 1929	928,094	926,561a	.....	1,533	.....
5 mo. end. May, 1930	4,184,210	4,445,620a	.....	*261,410*	.....
5 mo. end. May, 1929	4,568,033	4,437,343a	.....	130,690	.....

a Includes taxes. *b* Before adjustment bond interest. *c* In Mexican currency. *d* Net after rents. *e* After interest on income bonds. *f* Before taxes. *g* After city's 55 per cent. *h* Before depreciation. *j* Amount by which the full 5 per cent rental on Manhattan Railway guaranteed stock was not earned.

Digitized by Google

NEWS *of the Industry*

LATE NEWS

East St. Louis, Ill. — The Illinois Commerce Commission on July 23 took under advisement the application of the East St. Louis Railway for a straight 10-cent fare instead of 10 cents for single fares and five tokens for 40 cents. Prior to the conclusion of taking the evidence, the commission overruled a motion by counsel for the city for a reappraisal of the company's properties.

✦

Phoenix, Ariz.—At a meeting of the Council on July 14, it was decided to increase the fare on the municipal railway from 5 cents to 7 cents cash with four tokens for 25 cents for adults. School fares will be twenty for $1.

✦

San Diego, Cal.—At a recent meeting of delegates of the League of California Municipalities, a committee of the members was appointed, at the suggestion of Commissioner W. J. Carr of the California Railroad Commission, to develop a plan for assisting the cities, and supporting the railroad commission in the work of regulating the public utilities of the state.

✦

Jamestown, N. Y. — The Celoron Amusement Company, owned by the Jamestown Street Railway, which has operated an amusement park 5 miles from here on Lake Chautauqua, has been sold for $400,000, to Thomas and George Carr, managers of the park for the past ten years. The park was established 25 years ago by the late A. N. Broadhead, head of the railway, to promote business on its Celoron-Jamestown line.

✦

Los Angeles, Cal.—Five more single-deck, 29-passenger coaches are being delivered to the Los Angeles Railway to be added to the 2,300 series. These coaches are generally similar to the other rear-door equipment recently delivered, but are the first single-deckers to have single-sash drop plate glass windows.

✦

Rochester, N. Y.—In an endeavor to remedy abuses of the transfer privilege, the New York State Railways, Rochester lines, has put into use a new transfer to be issued to passengers only on request and at the time of paying fare, expect in emergency cases where cars are turned back. In such cases special emergency transfers will be issued.

✦

Quebec, Que. — As the result of an order from the railway commissioners, the Quebec Power Company is authorized to extend its street car service in St. François d'Assise and Charlesbourg, as far as the city limits. At present the track runs only as far as the new Canadian National Railway tunnel, but the extension is expected to be completed and in operation by the start of next winter.

(Late News Continued on Page 542)

Terminable Permit Suggested at St. Louis

Transportation Survey Committee Recommends Co-ordination With Liberal Subway Construction Program. Need for New Street Cars Stressed

THE Transportation Survey Commission of St. Louis, Mo., made its final report to the Board of Aldermen on July 25. Among other things it suggested that the St. Louis Public Service Company be granted a terminable permit for 50 years, thus giving the city the largest measure of home rule in the regulation of its railway and bus rates obtainable under the present city charter.

In its report the commission also favored co-ordination of cars and buses, ultimate elimination of parking downtown and in other congested districts, restrictions on service car operations, construction of a subway under Olive Street between Third and Nineteenth Streets to cost about $10,000,000, the rerouting of various railway lines, construction of traffic signals and safety zones at various points, completion of the street widening program prepared by the City Plan Commission and the elimination of 530 little-used street car stops on various lines.

The report recommends the adoption of the comprehensive plan of subway construction suggested by the Kinsey Commission in 1926, such construction to be undertaken when the city's growth demands these improvements. The subways suggested by the Kinsey Commission would cost approximately $240,000,000.

In his report on rapid transit R. F. Kelker, Jr., who was consulting engineer for the Transportation Survey Commission, contended that St. Louis is not ready for subways and that the existing surface street car lines can be developed to meet the city's transportation needs for years to come.

Stressing the necessity of new street cars, bus service extensions, rerouting of car lines and additional power facilities, the commission suggests that the Aldermen move to make it possible for the company to borrow $23,760,000 to carry through a five-year program of expenditures for new cars and betterments.

Two alternative plans of new permits for the railway are suggested:

1. A terminable permit for 50 years and providing home rule by securing necessary enabling legislation at the next session of the Missouri General Assemby to create a St. Louis Transit Commission having full power over local utilities, now vested in the Missouri Public Service Commission.
2. A contract with the railway in which it would agree to unify all mass transportation, and the city agree to acquire ownership of the properties through a share in the receipts from operation. In this connection the commission recommends that when the city obtains ownership of the transportation system it arrange for a lease for private operation.

Walter J. G. Neun, president of the Board of Aldermen, and Edward L. Kuhs, Aldermen from the First Ward, members of the commission, dissented from the recommendation for a terminable permit.

The Business Outlook

EXACTLY a year after business scaled the peak of its 1929 boom it is reaching its low in the subsequent depression. As we move further into the last half the paralyzing pessimism of recent months will find less to feed on in the comparative records of this year and last. While general trade is beginning to sag under the pressure of months of impaired confidence, industrial activity and railroad movement show signs of revival under the stimulus of depleted stocks, and non-agricultural commodity prices are strengthening. At this crucial point, emergency Farm Board support of farm prices against the weight of temporary crop surpluses, and further Federal Reserve support of the bond market are vitally necessary. This is the decisive round in the contest with the forces of deflation.—*The Business Week.*

Start Made on Chicago Subway Plans

Plans for Chicago's subway progressed apace when the first meeting of all concerned on actual subway construction since the approval of the transportation ordinance was held on July 23 in the office of Walter L. Fisher, attorney for the local transportation committee of the Council. The removal of pipes, wires, conduits, vaults and other property of the public utilities in State Street preparatory to digging the subway was discussed, but no decisions were made.

Engineers state that their plans have progressed to a point where it will soon be necessary to know what utilities wish to use the galleries to be provided for them in the subways, and which positions they prefer.

The "L" has filed condemnation proceedings against the property of 203 Chicago owners. It hopes in this way to procure the remaining property necessary for the widening of its Garfield Park branch between Marshfield and Laramie Avenues. Much of the necessary property has already been obtained by private purchase. This proposed improvement will be the first started under the terms of the recent franchise grant.

Digitized by Google

Electrification Prospects at Chicago

Definite action in Chicago's efforts to have its railroad terminals electrified is gradually approaching. The chairman of the City Council railway terminals committee, said recently:

"This committee has not yet given up hope of obtaining agreement of the railroads to a unified terminal and electrification of lines within the city. We are holding meetings weekly and are hopeful of results. However, if the railroads refuse to co-operate, the city will file a certificate of public convenience and necessity before the Commerce Commission citing the public need for electrification.

"So far the railroads have continued to declare that their revenues have decreased to such an extent that they are unable to electrify. They have stated that they have no prospect of much improvement within the next 25 years because of the increasing competition in passenger service from the automobile and airplane."

Rochester-Buffalo Coach Order Modified

The Public Service Commission has amended its order granting the Rochester, Niagara Falls & Buffalo Coach Lines, Inc., permission to operate a bus line between Rochester and Buffalo, by way of Lockport, N. Y. The modified order permits operation of buses only from Rochester to Lockport, where transfer must be made to the International Railway to Buffalo.

The coach company may renew its petition for a bus line through to Buffalo at the end of a six-months' period. It was planned to supplant the present Rochester, Lockport & Buffalo electric interurban line with buses. The officers of the coach company are the same as those of the electric railway.

Segregation Planned at Portland, Ore.

To facilitate compliance with a recent order of the Oregon Public Service Commission that the power and the railway businesses of the Pacific Northwest Public Service Company, Portland, be kept entirely separate, the company proposes to form two subsidiaries for administrative purposes. Under the plan proposed, the Portland General Electric Company will be formed to take over the physical property and franchises covering the power and light and interurban railway operations, and the Portland Traction Company to take the local railway property and franchises. The formation of the new companies has no interest at the present time for investors since the parent Pacific Northwest Public Service Company will become the sole owner.

747 Graduates of Chicago First Aid Classes

The Britton I. Budd Medal for the Saving of Human Life was awarded to two employees of the Chicago Rapid Transit Company, one employee of the Chicago, North Shore & Milwaukee Railroad, and one employee of the Chicago, Aurora & Elgin Railroad recently at the eighth annual first aid and safety banquet of the associated electric railway and motor coach lines serving the Chicago metropolitan area. Presentations of the medals were made by Mr. Budd, president of the companies, who instituted the award in 1926 as a fitting recognition for any employee who succeeds in saving the life of anybody, anywhere and at any time. These awards made a total of 21 employees of the various transportation lines who have saved human lives as a result of first aid training under the direction of the medical department, headed by Dr. Hart E. Fisher, chief surgeon. The banquet marked new records in first aid training of employees in these transportation companies, with a total of 747 receiving diplomas as compared with 558 last year.

Many Interesting Bus Topics on Pittsburgh Program

More than 1,000 traffic men and engineers, motor truck and motor coach operators are expected to attend the annual National Transportation Meeting of the Society of Automotive Engineers to be held in Pittsburgh, Oct. 22, 23 and 24. The Pittsburgh Section, under the direction of Chairman J. M. Orr, is making arrangements for the dinner and will conduct the affair. For the technical sessions the following speakers and topics have been selected and scheduled:

C. W. Stocks, editor of *Bus Transportation*, "Requirements for Performance-Indicating and Recording Devices, Their Installation and Operation."

H. B. Hewitt, of the Philadelphia Rural Transit Company, "Scientific Inspection of Motor-Vehicles and Their Units."

P. V. C. See, of the Northern Ohio Light & Power Company, "Motor-Vehicle Maintenance Methods to Prevent Delays."

Austin M. Wolf, consulting automotive engineer, "Practical Mathematics for Determining Tractive Ability."

Adrian Hughes, Jr., of the United Railways & Electric Company, Baltimore, "How Advantage Can Be Taken of the Latent Heat of Cooling Water."

James W. Trimmer, of the Carnegie Institute of Technology, "How the Principles of Economics in Motor-Vehicle Transportation Are Taught by Educational Institutions."

The paper by Professor Trimmer will be supplemented by prepared discussion by J. S. Lowe, of the Northern Ohio Light & Power Company, describing the school of training established by that company for its motor coach operators. Frank D. Coll, of the Aluminum Company of America, will present a paper describing the use of aluminum alloys in commercial motor-vehicles.

Canadians Announce Program for Ottawa Meeting

The tentative program has been announced for the papers and timely topics to be presented at the 26th annual convention of the Canadian Electric Railway Association at Ottawa on Sept. 18, 19 and 20. The program follows:

WEDNESDAY, SEPT. 17, 1930

Timely Topics — "The Effect of Traffic Lights on Street Car Operation," by D. E. Blair, general superintendent Montreal Tramways, and W. F. Irvin, traffic study engineer Toronto Transportation Commission.

THURSDAY, SEPT. 18, 1930

Paper — "The Trolley Bus," by E. A. West, general manager Utah Light & Traction Company.

Discussion led by Fred E. Dayes, chief engineer A.C.F. Motors Company, and Ross Schram, vice-president Twin Coach Corporation.

Timely Topics—"Fire Protection—Methods Used to Reduce Fire Hazards and Decrease Insurance Premiums," by J. C. L. Ryan, engineer and rating expert Johnson & Higgins, Ltd., Montreal, P. Q., and W. E. P. Duncan, engineer of structures Toronto Transportation Commission.

"Operating Features of Cars Recently Purchased by Canadian Electric Railways," by A. M. Lindsay, superintendent of rolling stock Montreal Tramways, and representative of British Columbia Electric Railway.

FRIDAY, SEPT. 19, 1930

Paper—"Street Railway Fares," by Prof. Albert S. Richey.

Discussion led by J. B. Hayes, manager Nova Scotia Light & Power Company, Ltd.

Timely Topics—"Welding as Applied to Track Maintenance," by W. A. MacRae, engineer of way Toronto Transportation Commission, and J. G. McCarty, manager Metal & Thermit Corporation, Toronto.

"Bus Inspection Methods," by H. R. Holder, superintendent of autobus department Montreal Tramways, and M. D. Mills, experimental engineer Motor Coach Division General Motors Truck Company.

Trouble Shooters of the Rochester Railway and Bus Lines Being Dispatched by President Tilton

Digitized by Google

LATE NEWS

(Continued from Page 540)

Washington, D. C.—One-man street cars will be installed on the Mount Vernon, Alexandria & Washington Railway on Aug. 15 if the Public Utilities Commission grants the plea of the railway asking permission for the change.

✦

New York, N. Y.—Representatives of the Board of Transportation are engaged in the work of getting written consent of property owners on the proposed subway route along Worth Street, East Broadway and Grand Street, from Church Street to Lewis Street, a project approved by the Board of Estimate recently.

✦

Chicago, Ill. — The receivers for the Chicago Railways were ordered by the United States District Court of Northern Illinois to pay regular semi-annual interest and 5 per cent on principal amount of the first mortgage bonds of the company on Aug. 1, 1930. Last year 10 per cent of the principal amount of these bonds was paid by order of the court and interest has been regularly paid since the bonds defaulted in principal in 1927.

✦

Pittsburgh, Pa. — Trainmen of the Pittsburgh Railways have defeated a proposal that they work on a six-day instead of seven-day schedule to save the jobs of 300 now on the "extra list" or soon to be there.

✦

Fort Wayne, Ind. — Arrangements have been made for the hearing of evidence on the petition of the Indiana Service Corporation for authority to increase the price of a single cash fare from 7 cents to 10 cents and the price of four tokens from 25 cents to 30 cents. The company will continue to sell its weekly pass for $1. The corporation announced about a year ago, when it granted an increase in wages, that it would ask an increase in fares. Its officials maintain that its rate of return has fallen off since 1926 and that it cannot maintain efficient service and extend its service without the petitioned increase.

✦

Holyoke, Mass.—Early installation of the one-man system of operation by the Holyoke Street Railway is forecast. Directors have agreed to authorize the manager to put the plan in force at such time as he deemed necessary.

✦

Atlanta, Ga.—The Georgia Supreme Court has upheld the right of the State Public Service Commission to regulate motor carriers. In a decision rendered on July 26, the state's highest tribunal declared the Fulton Superior Court in error in granting an injunction to the Saye M. Davis Transfer Company to prevent regulation. The Supreme Court held that the motor carrier act of Georgia was not unconstitutional, as declared by the petitioner, and that it was unnecessary to determine whether a carrier was a private or common servant.

✦

Grays Harbor, Wash.—More than 5,000 youngsters and parents of Grays Harbor County consumed 750 gal. of ice cream and 23,000 cones at the Fourth Annual Kids Party held at Electric Park, Aberdeen, Wash., by the Grays Harbor Railway & Light Company in July. The announcement of this year's party was one of the first official acts of J. R. Snider, newly elected general manager of the company, to allay the juvenile fears that the party might be discontinued because of the death of its founder, Wallace W. Briggs. A feature of the party was the dedication of an ornamental fountain carrying the following inscription: "Wally Briggs Swimming Hole, built for the boys and girls of Grays Harbor, and dedicated to their happiness by Wallace Wheaton Briggs, general manager, 1929."

✦

Baltimore, Md.—William McCallister, president of the Hamilton Improvement Association, has suggested to the United Railways & Electric Company a bus line to connect the Harford and Belair roads, providing a more direct route from that section of the city to the southeastern section. It is urged that the route follow the new Echodale Boulevard, which is to be built.

✦

Staunton, Va.—The City Council has directed City Manager Day to transmit to officials of the Shenandoah Traction Company at Pittsburgh an approved draft of a franchise for operation of a bus service here in place of the existing railway. As the draft has the approval of the city attorney and attorneys for the new company, the action is regarded as practically the final step in agreement on a bus franchise. The final franchise draft provides for a fare not more than 10 cents, subject to revision within five years to "not less than 5 cents." The grant is to run for 15 years.

✦

Rochester, N. Y.—An order for discontinuance of the Rochester & Eastern Railway, was signed on July 26 by Judge Simon L. Adler in Federal court, on the application of receivers for the New York State Railways. It was made effective at midnight July 31. Seven communities on the route will be left without transportion. Other parts of the line are being served by a bus line with headquarters in Syracuse.

✦

High Point, N. C.—Members of the City Council will submit a plan to officials of the North Carolina Public Service Company calling for the operation of buses here instead of street cars, and giving the company the right to remove all trackage that is not needed by the High Point, Thomasville & Denton Railroad for car shifting purposes.

They Saw It in the News

A 17-LINE ride-selling item in ELECTRIC RAILWAY JOURNAL NEWS for May 31 has provoked inquiries to the company mentioned from Pittsburgh, Binghamton, Los Angeles, Des Moines, Seattle, Tacoma and other cities for further details. This is typical. If you are not reading ELECTRIC RAILWAY JOURNAL NEWS, you are missing a service designed especially to keep you well-informed on current events. And current events are the materials that make history!

Cleveland, Ohio.—The charge that the Cleveland Interurban Railroad, which operates the Van Sweringens' Shaker Heights rapid transit line, violated the Ohio utilities regulations when it increased the fare from 10 to 15 cents has been made in a petition filed with the Ohio Utilities Commission.

✦

Washington, D. C. — Revaluation of the local railways based on a physical inventory of their used and useful property has been asked of the Public Utilities Commission by Richmond B. Keech, people's counsel. The revaluation is asked to establish a new basis for fixing rates, in an effort to bring about a reduction in the 10-cent cash fare, with four tokens for 30 cents, recently granted by Justice Jennings Bailey, of the District Supreme Court. Mr. Keech contends that radical changes have taken place in prices and equipment since the physical inventory of 1914.

✦

St. Augustine, Fla.—Service by bus has been substituted for the trolley line to St. Augustine Beach run by the Florida Power & Light Company.

✦

Richmond, Cal.—The Key System Transit Company has applied to the California Railroad Commission for an order permitting the operation of a bus line here in accordance with a permit granted by the City Council.

✦

St. Louis, Mo.—Counsel for the St. Louis Public Service Company on July 28 asked the Public Service Commission to dismiss the protests against the rerouting of cars on the Fourth Tower Grove, Compton and Bellefontaine lines. The company points out that it cannot furnish a "door-to-door service to its patrons," and that the line was rerouted in the interest of the general good of patrons and of economy in operation.

✦

Chicago, Ill.—Federal Judge Wilkerson entered a decree on July 23 fixing the amount and priority of liens against the Chicago City Railway and the Calumet & South Chicago Railway. Receivership proceedings have been continued until Sept. 25, after which date an order of sale will probably be entered.

✦

Jamestown, N. Y.—Work of removing the tracks of the Warren & Jamestown Street Railway in this city is under way. The company abandoned service between Warren, Pa., and Jamestown, N. Y., Dec. 1, 1929, and the removal of tracks marks the termination of the line.

✦

Venice, Ill.—Preliminary steps have been taken toward the construction of an 800-ft. reinforced concrete viaduct to carry Broadway here, over the tracks of the Terminal Railroad Association and other railroads. The estimated cost of the project is $500,000. The Terminal Railroad Association of St. Louis, the Illinois Terminal Railroad and the city of Venice would share the cost.

✦

Raymond, Wash.—The Willapa Electric Company has replaced operation of its railway system in the South Bend-Raymond district with buses. Workmen are removing the tracks through Raymond to speed up paving of the state highway which is to form an important link in the Ocean Beach route.

Digitized by Google

Amicable Settlement of Niagara Falls Case Arranged

The Public Service Commission on July 29 approved the operation of buses by the International Railway on Hyde Park Boulevard and other streets in Niagara Falls to supplement its trolley service. The line will be established only if the International Railway's petition for an 8-cent fare is granted.

The order of the commission approves a franchise granted to the International Railway by the City of Niagara Falls for the operation of buses over streets extending northward through a comparatively new section of the city and looping at the southeast through an older part of the city. The new line is about 4 miles long.

The proposed bus line is to provide needed additional service for employees of industrial plants at the northern end of the route and at the loop over which the buses are to be turned at the southern end of the route. Buses are to be operated on a 30-minute headway during the day, except that, during the morning and evening rush periods service will be maintained on a 15 minute headway. A 10-cent fare is to be charged and transfers will be given from buses to connecting trolleys and from trolleys to buses upon payment of a 10-cent fare on the trolley cars.

The city of Niagara Falls favored the establishment of the proposed bus line and no opposition was expressed to the application. In a memorandum written by Commissioner Maurice C. Burritt, and approved by the commission, it was stated that "it appears that approval of the petition is in the public interest and that it will add to the convenience of the people of Niagara Falls in traveling over the streets of the city and in supplementing the present street car system."

City Agreeable

Without waiting for its new schedule of increased fares to be approved by the Public Service Commission, the International Railway decided immediately to improve service in Niagara Falls, N. Y., by inaugurating a system of more frequent service on every line in the city and by starting the work of improving and renovating its rolling stock.

Application has been made to the Public Service Commission by the company for approval of the schedule of increased fares granted the company by resolution of the City Council, meeting on March 17.

The agreement entered into between the company and the City Council grants the company a trolley fare of 8 cents a passenger on local lines; or sale of two tickets or tokens for 15 cents, and grants an increase from $1 to $1.50 on sale of commutation books of 20 tickets each between the old village of La Salle and Niagara Falls with transfer privileges to or from local lines in Niagara Falls, but commutation tickets will not be accepted as part payment for a through fare.

The railway promptly issued a statement to the effect that in appreciation for the "splendid spirit of fair dealing" that the people of the city have displayed in the settlement of the fare controversy it "has decided to do even more than it promised."

The whole matter is a lesson in good public relations not easy to match. Not only did the proposal meet with hearty approval by the public, but the attitude of the local newspapers, particularly the Niagara Falls *Gazette*, was most helpful. Evidently baiting big business has no zest for the local papers. On various occasions the *Gazette* put the matter this way:

"No contract that is confiscatory is binding. Niagara Falls does not want to take advantage of such a contract, if expressions of the people are to be accepted as indicating public sentiment.

"The Buffalo *Evening News* sees in the Niagara Falls situation a rare opportunity for this community to wallop the traction company, but fortunately we do not treat our business interests that way."

"The increase asked by the company is very reasonable, and its consent to abide by this figure for a term of at least ten years is an earnest of its good faith. The *Gazette* feels that the City Council has performed a good stroke of business for Niagara Falls. The increase in fares was inevitable, and by arriving at this very satisfactory settlement of the matter the city is saved a large sum of money in lawyers' fees, expert hire, and other costly incidentals that usually feature litigations in cases of this character."

Congestion Greatest Economic Problem Before the Cities

H. M. Patton, district superintendent of the Union Electric Light & Power Company, St. Louis, Mo., was elected president of the Missouri Association of Public Utilities at the recent meeting of that body to succeed Major T. J. Strickler, Kansas City. The election took place at the closing session of the three-day convention of the association which was attended by 200 delegates from various parts of the state.

A feature of the convention was the address of Milton R. Stahl, chairman of the Missouri Public Service Commission, in which he advocated a broadening of the powers of the commission to give it jurisdiction over holding companies for local public utilities and supervision over the sale in Missouri of stock in holding companies.

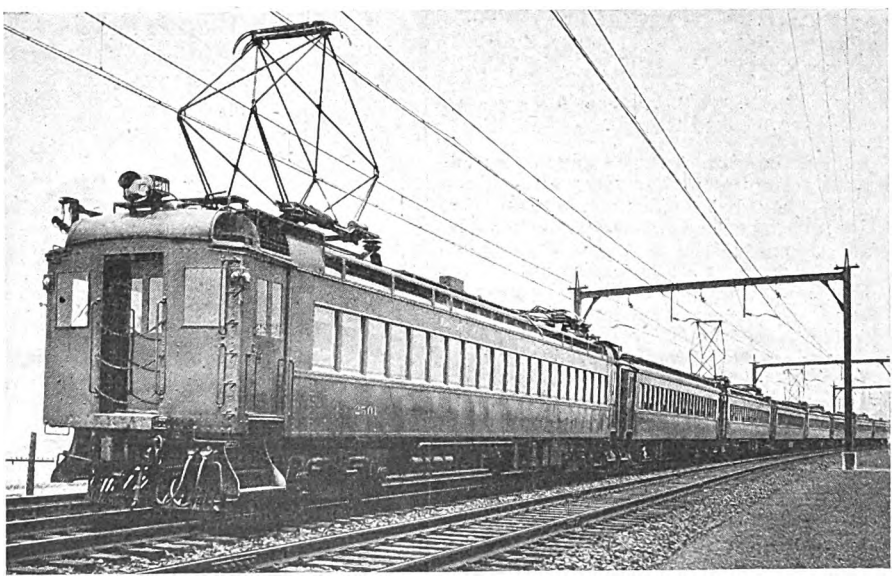
Better use of existing street facilities would solve many of the traffic problems of large cities, Charles Gordon, managing director of the American Electric Railway Association, asserted in his address. He expressed the belief that existing thoroughfares should be used to their fullest extent rather than for a city to indulge in expensive street widening and expansion program.

He brought out that acute street traffic problems are manifest in all of the major cities and in many of the small cities and towns as well. He said that congestion of streets has become perhaps the greatest single economic problem confronting modern cities and that it is already having a profound effect upon the business and social life and is threatening to bring about major readjustments of property values and business locations, particularly in the central business districts.

Lackawanna Plans Electric Suburban Service Sept. 15

Electric service probably will be started by the Delaware, Lackawanna & Western Railroad on the Montclair division about Sept. 15. One electric train at a time will be substituted for a steam train in the regular schedule. Operation and performance will be watched carefully and if any difficulties arise they will be ironed out before the next train is put into service. Subsequent substitutions will be made train for train until full electric service is in operation. Meanwhile, four engineers are receiving instruction on the new equipment daily. To the end that service may be begun as scheduled, the first of the new multiple-unit trains was operated at 4 p.m., on July 17. Since that time four-car and eight-car trains have been run daily between Bergen Junction and Secaucus, N. J., to test equipment and instruct trainmen. Runs have also been made along the main line from Bergen Junction to Harrison Tower.

Substation equipment is being installed according to schedule. Buildings are completed and electrical apparatus is approximately 50 per cent in place. New cars are arriving and trailers are being converted at the rate of one a day and will continue on that schedule until the completion of 141 units, each consisting of motor car and trailer.



Train Being Used for Tests on Lackawanna's New Electric Zone

Digitized by Google

Companies in Suburban New York Seek Fare Increase

The Yonkers Railroad, the Westchester Electric Railroad, and the New York, Westchester & Connecticut Traction Company, on July 30, petitioned the Public Service Commission for permission to increase their fares from 5 to 8 cents in Yonkers, Mount Vernon and other portions of Westchester County.

The petitions of all companies stated that the present rate of 5 cents does not provide a fair return on their investments and that the proposed 8-cent fare will constitute no more than a just and reasonable rate.

The Yonkers Railroad desires to charge 8 cents for rides in the city of Yonkers and in Mount Vernon where it has a line also, and to increase the fare to 8 cents in every instance where a 5-cent fare is now collected. The company states that in 1929 its revenue was $1,284,598, and that this fell short by at least $390,000 of meeting the operating expenses of the company, and that it fell short by about $325,000 of yielding a 7 per cent return.

The Westchester Electric Railroad desires to charge 8 cents instead of 5 cents for rides in the city of Mount Vernon, the villages of Pelham, Pelham Manor and North Pelham and between points where a 5-cent fare is now charged. The petition does not ask an increase for rides originating and terminating within the city of New York. This company states that its 1929 revenue of $785,349 fell short of meeting operating expenses by at least $355,000 and of yielding a 7 per cent return by at least $309,000.

The Westchester & Connecticut Traction Company desires to charge 8 cents for rides in Mount Vernon and North Pelham and between other points where a 5-cent fare is now collected. This company states that its 1929 revenue of $83,160 fell short by at least $32,500 of meeting expenses, and that it fell short by at least $28,000 of yielding a 7 per cent return to the company on its investment and property value.

Trolleys Speeded by New York's New Stagger System

The co-ordinated "stagger" traffic light system went into effect throughout Manhattan at 7 o'clock on the morning of July 30. Control mechanisms were adjusted after the light control stopped for the night at 3 a.m. and when it went into operation again the light changes were so timed that north-and-south traffic flowed uninterruptedly for about a minute and a half, instead of two minutes as formerly and east-and-west traffic ran for about 30 seconds, instead of one minute.

To speed the movement of traffic in the Times Square district, the light tower at 45th Street was removed. This was the point from which Commissioner Whalen last year observed the results of the traffic regulations he put into effect for the theatrical district. It has stood in front of the Hotel Astor for seven years.

Changing the light mechanism to "stagger" the traffic was a simple matter of setting disks in the central control towers to revolve at constant speed with the signal systems for the various avenues and streets. Readjustments were made at the central control room in the West 30th Street station and at the auxiliary control room in the West 126th Street station.

Police Commissioner Mulrooney had observers stationed in many parts of the city. He reported gains in speed from 15 to 50 per cent. William G. Fullen, chairman of the Transit Commission, who had inspectors on the job, had a table of data showing one gain of as high as ten minutes from westbound trolley traffic on 34th Street. The Third Avenue Railways reported a 33 per cent gain in speed on the 42nd Street line, with other gains on different lines.

All reports contained assurances as well that while crosstown traffic had been speeded the gains had not been effected at the expense of the longitudinal vehicular flow. Most of the reports said that there had been some speeding up of north-and-south traffic, although to a considerably lesser degree.

William Thompson, vice-president of the Third Avenue Railway, said:

> The new system has resulted in a material increase in speed on our crosstown lines without any retarding of north-and-south traffic. In fact we have received reports of some light gains in north-and-south traffic. On the 42nd Street crosstown line the speed gain was about 33 per cent, on the 59th Street line about 19 per cent and on the 125th Street line about 15 per cent.

At the offices of the New York Railways it was announced that the crosstown trolley car movement had shown definite gains in speed, although data had not been compiled to show the actual gains. This statement also emphasized that north-and-south traffic had not been impeded.

Officials of the Fifth Avenue Coach Company said they were still checking their data, but that a preliminary survey had indicated gains in the operation of their buses.

Indiana Railroad Succeeds to Union Traction Properties

INDIANA Railroad is the new name under which the electric interurban lines of the old Union Traction Company of Indiana began operating on Aug. 1.

Properties of the Union Traction Company, which were purchased at a receiver's sale in Anderson on July 2 by B. P. Shearon, secretary of the Midland United Company, have been conveyed by order of the Madison Circuit Court to the Indiana Railroad, which is a subsidiary of the Midland United Company.

The full amount of the purchase price, $3,923,933, including $376,528 in cash and the rest in bonds and other securities, was paid to Arthur W. Brady, the receiver, by the Midland United Company on July 17. The new owners, however, will not assume full control of the properties until Mr. Brady makes his final report to the court and relinquishes the receivership, probably the latter part of August.

Operation of the Indiana Railroad will be under the direction of Henry Bucher, vice-president of the Indiana Service Corporation. Mr. Bucher is the managing executive of the railway department, through which the operation of other electric railways in central and southern Indiana controlled by the Midland United Company is now co-ordinated.

The electric interurban lines, which will be operated under the direction of one centralized supervisory management at Indianapolis, include the line between Indianapolis and Louisville operated by the Interstate Public Service Company, the lines of the Indiana Service Corporation radiating from Fort Wayne, the line of the Northern Indiana Power Company extending from Frankfort to Kokomo and Marion, and the old Union Traction Company which now becomes the Indiana Railroad.

Co-ordination of service and schedules, which it is believed will be of benefit to the traveling public, is expected to be one of the results of the centralized control of operations of these railways.

The board of directors of the new Indiana Railroad elected the following officers at a meeting held in Chicago, on July 30:

Samuel Insull, chairman of the company.
Samuel Insull, Jr., chairman of the executive committee.
Robert M. Feustel, president.
William A. Sauer, vice-president.
Henry Bucher, vice-president and general manager.
George F. Mitchell, treasurer.
Bernard P. Shearon, secretary.
Edwin J. Booth, comptroller.

The directors of the company are: Mr. Insull, Mr. Insull, Jr., Mr. Feustel, Mr. Sauer, Mr. Bucher, Charles W. Chase and L. M. Brown.

COMING MEETINGS

Aug. 13-14—Wisconsin Utilities Association, Milwaukee, Wis.

Aug. 14—American Electric Railway Assn., Metropolitan Section, Sixth Annual Outing, Luna Park, Coney Island, N. Y.

Sept. 5-6 — Central Electric Traffic Association, Wawasee, Ind.

Sept. 10-11—Central Electric Railway Master Mechanics' Association, Miami Hotel, Dayton, O.

Sept. 17-19 — Canadian Electric Railway Association, 26th annual convention, Ottawa, Canada.

Sept. 25—Pennsylvania Street Railway Association, Casey Hotel, Scranton, Pa.

Oct. 9-11—Midwest Electric Railway Association, Miami, Okla.

Oct. 22-24—National Transportation Meeting of the Society of Automotive Engineers, Pittsburgh, Pa.

Oct. 29-30—Iowa Electric Railway Association, Des Moines, Ia.

Digitized by Google

Vote on Future of the Boston Elevated Railway

At the state election in November of this year there will be submitted to the registered voters of the cities comprising the so-called Metropolitan District, the following plans for determining the future ownership, management and operation of the Boston Elevated Railway, Boston, Mass., namely:

Plan No. 1. Return to the Boston Elevated Railway of the management and operation of its railway system by terminating public management and operation thereof.

Plan No. 2. Continuation of public management and operation of the Boston Elevated Railway in accordance with such terms and conditions as may be agreed to by the stockholders of said company.

Plan No. 3. Purchase by the Metropolitan Transit District of the whole assets, property and franchises of the Boston Elevated Railway, the same thereafter to be owned, managed and operated by said district.

The referendum will have no legal effect, but will merely inform the succeeding Legislature as to the preferences of a majority of the voters of the Metropolitan Transit District. It will be necessary for the Legislature to enact legislation to put into effect any one of the foregoing plans.

Proposed Abandonment Under Inquiry

Engineers of the Ohio Public Utilities Commission will make a survey of the rolling stock and roadbed of the Scioto Valley Railway & Power Company to aid in determining whether the road should be permitted to abandon railway service between Columbus and Chillicothe and Columbus and Lancaster. At the first hearing, held on July 23, officials of the company testified that $200,000 would have to be expended to place the rolling stock and the roadbed in good condition. They said the company could not finance this program inasmuch as the road now is operating at a loss of $7,000 per month. Residents insist the lines are a necessity and that, under more skillful management, the system could be made profitable.

Question of Jurisdiction in San Diego Hearing

The hearing scheduled to be held by the Railroad Commission in San Diego, Cal., on June 19, in the matter of the application of San Diego Electric Railway to abandon railway operation and remove its tracks in Coronado, substituting therefor through bus service over the ferries of the San Diego & Coronado Ferry Company into San Diego, was continued without taking of testimony as to public convenience and necessity. The application was amended to offer loop bus service in Coronado and continue the railway operation there as a concession to the expressed desire on the part of residents who prefer to transfer from the cars to the upper decks of the ferry boat rather than be shut in on the automobile deck in a bus.

At the hearing the City Attorney and members of the City Council said they had before them the matter of municipal operation with buses to be furnished by a proposed rival bus company on a rental basis, wherein the city was to be guaranteed against any losses for a period of five years. They requested that action on the application of the railway be postponed until they could determine what action they wished to take in the matter. It was also contended that inasmuch as the operation of the proposed bus service was entirely within the limits of Coronado, the commission had no jurisdiction, the railway being subject only to municipal control through franchise requirements. Since there is some question as to proper interpretation of the Public Utilities Act, the commission took the matter under advisement to determine its jurisdiction before hearing is to be continued.

The matter is of interest because of the attempt of private parties to enter into bus competition with established utility under the guise of municipal operation, the private parties obtaining remuneration through tolls received from ferrage of the vehicles across the Bay of San Diego, including tolls for the passengers, by means of a rival ferry company.

A Hitch in Hitch-Hiking

THE practice of "thumbing" for rides has become an annoying business. That it is also extremely dangerous for the good-natured motorist to pick up strangers has been proved in innumerable cases.

Some of these motorists have been murdered by their "pick-ups," and many others have been beaten and robbed of money and cars. Still others have had to defend suits brought for injuries by the thumbers to whom they gave assistance, and on several occasions innocent motorists have become involved with the courts for aiding fugitives, youthful runaways and delinquent girls.

While some states have taken official action to stop ride-begging on their highways, the one way to put a stop to the nuisance is for motorists everywhere to pass the thumbers by. The only persons who can put a real hitch in hitch-hiking are the motorists themselves. Motor clubs could save some of their members much embarrassment and grief, by acquainting them of the dangers they run by picking up strangers on the highways.—*Condensed from the Cincinnati Enquirer.*

A. C. Blinn in Charge of Ohio Edison Operations

Announcement Made of Official Roster of Officers for New Merger Company in Commonwealth & Southern Group Operating in Ohio

OFFICIAL announcement was made, on July 23, of the organization of Ohio Edison Company, created by the consolidation of the Pennsylvania-Ohio Power & Light Company, Northern Ohio Power & Light Company, the Ohio Edison Company, the Akron Steam Heating Company, and the London Light & Power Company. The company will be operated by divisions with the general headquarters in Akron.

A. C. Blinn in Charge

A. C. Blinn, who has been vice-president and general manager of Northern Ohio Power & Light Company for many years, will be vice-president and general manager of the Ohio Edison Company in charge of all the utility operations.

L. G. Tighe, for the last six years assistant general manager of Northern Ohio Power & Light Company in Akron, has been made a vice-president and director of the new company, and will be manager of the Akron division which includes the cities of Akron, Barberton, Cuyahoga Falls, Kent, Tallmadge, Lakemore, Northfield, Brimfield and a large number of other smaller communities.

C. S. MacCalla, formerly vice-president and general manager of the Pennsylvania-Ohio Power & Light Company, is a vice-president and director of Ohio Edison, and will be manager of the Youngstown division, comprising the cities of Youngstown, Girard, Lisbon, Salem, Struthers, Leetonia, Canfield, Columbiana, Kinsman and numerous other towns and communities.

H. E. Miller, former general manager and director of the Ohio Edison Company at Springfield, will be manager of the Springfield division, which includes Springfield, London, Marysville, Urbana, Mechanicsburg, Westville and other communities.

Other officers of the company are: H. G. Kessler, New York, comptroller; P. Murdoch, Akron, general auditor, with H. R. Bowie, Youngstown, assistant; E. G. Dunlap, Youngstown, treasurer; C. H. Lahr, Akron, secretary; L. I. Wells, Akron, E. E. Nelson and C. Wigand, New York, assistant secretaries and assistant treasurers.

B. C. Cobb the President

B. C. Cobb heads the new company as president and chairman of the board of directors. Other directors are A. F. Ayers, Akron; W. H. Barthold, New York; A. C. Blinn, Akron; W. H. Foster, Youngstown; H. E. Freeman, Springfield; J. T. Harrington, Youngstown; T. A. Kenney, New York; C. S. MacCalla, Youngstown; H. E. Miller, Springfield; J. G. Robertson, Akron; L. G. Tighe, Akron; W. L. Willkie, New York. Mr. Barthold, Mr. Kenney and Mr. Harrington are also vice-presidents, as is M. W. Arthur of New York.

Ohio Edison Company assumes all the bonds and other indebtedness of the Pennsylvania-Ohio Power & Light Company, Northern Ohio Power & Light Company, the Akron Steam Heating Company, the Ohio Edison Company and the London Light & Power Company.

Digitized by Google

"Selling Transportation" Is Theme of Coffin Award Review

While it is impractical, of course, to make the full text of the Charles A. Coffin Award briefs available for general circulation, the American Electric Railway Association has done much to overcome this deficiency by publishing a digest in which the outstanding features of the respective briefs are set forth. The latest publication of this nature, covering the briefs submitted in the 1928 and 1929 contests, is now being distributed from the association headquarters to member companies. The book is entitled "Selling Transportation." It has been prepared under the direction of Prof. Albert S. Richey, acting for the Coffin Foundation, with a foreword by J. P. Barnes, president of the association in 1928-29.

The street railway companies which competed for the award in 1928 were: El Paso Electric Company, Gary Railways, Northern Texas Traction Company, San Antonio Public Service Company, Shreveport Railways, and Virginia Electric & Power Company. The El Paso Electric Company and the Northern Texas Traction Company were again contestants in 1929, and in addition briefs were submitted by Chicago, South Shore & South Bend Railroad, Community Traction Company (Toledo), Detroit Department of Street Railways, Houston Electric Company, and the Youngstown Municipal Railway.

Conforming to its title, "Selling Transportation" is made the central theme of the book, and the various chapters, dealing with service betterment, selling rides, going after business, new and modernized cars, the place of the bus, rolling stock and track maintenance, safety, and employee co-operation, are all edited with emphasis upon this main idea of disposing of the product of transportation.

Under the general heading of service betterment, the matter of speed receives special attention. As one of the briefs expresses it, "speed is the very essence of transportation." The Gary Railways, realizing that railways must speed up to exist, points out how it has increased its average speed from 9.11 to 9.95 m.p.h. The Detroit Department of Street Railways features its rapid transit surface line, the Jefferson Avenue Express, which, in 1928, maintained an average schedule speed of 18.5 m.p.h. over its 4.3 mile route, while the Chicago, South Shore & South Bend Railroad credits its high speed interurban service with having done much to check automobile competition.

Perhaps more than ever before is recognition given to the human element and its responsibility in the sale of service. Practically every brief submitted placed special emphasis upon this feature, and the winning companies, the Virginia Electric & Power Company in 1928 and the Chicago, South Shore & South Bend Railroad in 1929, credit their exceptionally successful records largely to this factor. There is a growing appreciation of the fact that it is the man on the platform who makes the service either satisfactory or otherwise. The efforts of the personnel have been supplemented and backed up by the efforts of the companies in cleaning and painting, and in making the physical plant more attractive.

Advertising and newspaper publicity have attained a much higher level, according to the chapter devoted to this subject. Public relations have greatly improved and, thanks to a general policy of supplementing words with actions, there is, in general, a growing feeling of mutual confidence between electric railway managements and the public and local authorities. This is made evident by the success of Houston in securing relief from jitney competition; of San Antonio, where an increase in fares was granted; and Toledo and Youngstown where notable progress was reported in securing franchises free from many of the onerous impositions of the past.

The chapter on operating economies contains much information of a general nature on this subject, while the chapters on rolling stock maintenance, track construction and maintenance and power and line economies constitute a veritable handbook of good operating practice in these important fields. Solicitude for the general welfare, health, happiness and contentment of employees, individually and as a group was manifest in all presentations. That this has been reciprocated is made evident by the more intelligent co-operation between men and management which characterizes the general trend of employee relations.

In his foreword, Mr. Barnes has aptly expressed the aim and purpose of the volume. "It is offered," he states, "with the hope that the fundamental and far-reaching policies which have characterized award submission of the last two years will prove of maximum inspiration to a maximum number of readers."

Conspectus of Indexes for July, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years	
				High	Low
Street Railway Fares* 1913 = 4.84	July, 1930 **7.97**	June, 1930 **7.97**	July, 1929 **7.76**	July, 1930 **7.97**	July, 1925 **7.27**
Electric Railway Materials* 1913 = 100	July, 1930 **136.2**	June, 1930 **138.9**	July, 1929 **147.5**	Dec., 1926 **159.2**	July, 1930 **136.2**
Electric Railway Wages* 1913 = 100	July, 1930 **231.7**	June, 1930 **231.7**	July, 1929 **230.9**	July, 1930 **231.7**	July, 1925 **222.5**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	July, 1930 **197.7**	June, 1930 **199.5**	July, 1929 **199.0**	Nov., 1928 **205.7**	July, 1930 **197.7**
General Construction Cost Eng'g News-Record 1913 = 100	July, 1930 **201.0**	June, 1930 **203.4**	July, 1929 **204.8**	Jan., 1927 **211.5**	July, 1930 **201.0**
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	June, 1930 **86.8**	May, 1930 **89.1**	June, 1929 **96.4**	Nov., 1925 **104.5**	June, 1930 **86.8**
Wholesale Commodities Bradstreet 1913 = 9.21	July, 1930 **10.56**	June, 1930 **10.77**	July, 1929 **12.49**	Dec., 1925 **14.41**	July, 1930 **10.56**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	June, 1930 **147.9**	May, 1930 **150.1**	June, 1929 **154.8**	Nov., 1925 **167.1**	June, 1930 **147.9**
Cost of Living Nat. Ind. Conf. Bd. 1914 = 100	June, 1930 **154.8**	May, 1930 **156.2**	June, 1929 **160.0**	Nov., 1925 **171.8**	June, 1930 **154.8**
Industrial Activity Elec. World, kw.-hr. used 1923-25 = 100	June, 1930 **115.5**	May, 1930 **119.0**	June, 1929 **135.2**	Feb., 1929 **140.4**	Aug., 1925 **94.3**
Bank Clearings Outside N. Y. City 1926 = 100	June, 1930 **92.1**	May, 1930 **92.1**	June, 1929 **102.2**	Oct., 1929 **111.8**	June, 1930 **92.1**
Business Failures Number	June, 1930 **1874**	May, 1930 **2083**	June, 1929 **1482**	June, 1930 **1874**	Sept., 1928 **1348**
Liabilities, Millions of Dollars	**114.40**	**57.72**	**64.15**	**114.40**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Noise Elimination in Rapid Transit Studied

Under the direction of Robert Ridgway, chief engineer, the transit experts of the city of New York have been making a thorough study of proposals for the improvement of equipment, rolling stock, road ballast and subway turnstiles to eliminate all unnecessary noises. They also have under consideration the advisability of sound-deadening linings for the reduction of loud noises caused by fast operation of trains through underground tubes.

The city's engineers believe that the method of laying tracks on ties imbedded in concrete, now being used in the new subways, will be less productive of operating noises than the use of the stone or gravel ballast. The latter method, they believe, results in failure of track alignment, low rail joints and other noise-producing defects.

The engineers have designed the city's new subway cars so that they will operate with a minimum of noise. They are also studying the suggestion that subway tubes be sheathed, or partly sheathed, with some sound-deadening application or material, but thus far have come upon no practical method of accomplishing this result.

In a report to Chairman Delaney, Mr. Ridgway pointed out that the problem of eliminating noise from subway and elevated operation was studied as early as 1923 when a special committee was named. Since that time the Board of Transportation's engineers have studied surveys made by operators of the London Underground Railway in an effort to reduce operating noises.

Digitized by Google

FOREIGN NEWS NOTES

Construction of New London Subway Approved

The Select Committee of the British House of Lords has approved the preamble of the bill for the extension of the Piccadilly subway, London, from Finsbury Park to Cockfosters. The measure has already passed through the House of Commons Committee, so that, subject to the formality of the Royal assent, the London Underground Railways combine proposes to have the contract ready for inviting tenders for the work returnable by July 15. Actual work will be started not later than Sept. 1.

The London & North Eastern Railway was the principal opponent of the bill before the committees of Parliament. That company's decision to electrify its suburban lines was subject to two conditions, a satisfactory financial grant from the government under the Development Act, and a satisfactory arrangement for terminal accommodation in central London. The subway project has not killed the electrification proposals. Approval of that bill means competition by subway with that part of the Northeastern line it is proposed to electrify. Should the company not electrify its lines, the loss of traffic to the new subway will be much heavier. Final decision is not likely until the amount of state assistance the company will receive is known.

✦

London's New Suburban Line

The chief event of the New Year in London up to the present has been the opening of the electrified extension of the Southern Railway's suburban system, linking Wimbledon and Sutton, southwestern suburbs. During business hours trains from these terminals now run to central London every twenty minutes, and every half-hour at other times. The value of this extension will increase with the development of the St. Helier, Sutton Common, and Sutton West districts. From St. Helier station, which serves the new London County Council housing estate, central London is reached in 34 minutes. The new piece of line is 5¼ miles in length, and there are six new stations. Work on the section began in October, 1927, and 24 bridges had to be built, including three foot bridges. The trains are composed of eight coaches, giving room for 112 first-class and 540 third-class passengers. Cheap weekly, monthly, and quarterly season and cheap day-return tickets are available, and will help popularize the service.

In this connection it should be noted that the electrification of three important new sections of the Southern Railway, one of Britain's railroad "Big Four," is to be completed this year, under the construction plans for 1930. The total expenditure authorized for the year is $21,500,000, about one-third of which will go to pay for new rolling stock. Approximately $3,000,000 will be spent on electrification.

✦

Scenic Trips by Electric Railway in Japan

Electric railways operating from Osaka, Japan, to many suburbs, including Kyoto, Kobe, Wakayama and Nara, enable the tourist to visit many temples, shrines, tombs and scenic points. The Daiki Railway goes to Nara, the ancient capital of Japan, where are the Kasuga Shrine, the Todaiji Temple and the great Buddha. Nara is only a 50-minute ride from Osaka. The trip on the Keihan permits the visitor to see the mausoleum where the late Emperor is buried, and visit Lake Biwa and the cherry blossom region of Mount Arashiyama. Koshien Field with a grandstand and bleachers seating 80,000 persons, is reached on the Hanshin line. Not only have the Japanese gone in for utility as instanced by their rapid transit lines, but they have not neglected the aesthetic side as one of the two accompanying pictures makes plain.

Incidentally it should be noted that plans are being made for further electrification of the Japanese government railways. The portions under consideration are those between Tokyo and Yokosuka, Kozu and Atami, Ueno and Abiko, Yokohama and Hachioji, Tachikawa Asakawa, Kioto and Nara, Tennoji and Umeda, Otsu and Akashi. Details of the plans are being worked out by a special committee in the railway office. When electrification is completed, it is expected to have a considerable influence on the passenger traffic of the existing interurban lines. Overhead contact lines have already been installed on the section between Tokyo and Yokosuka and between Kozu and Atami.

✦

Subway Financing for Buenos Aires Arranged

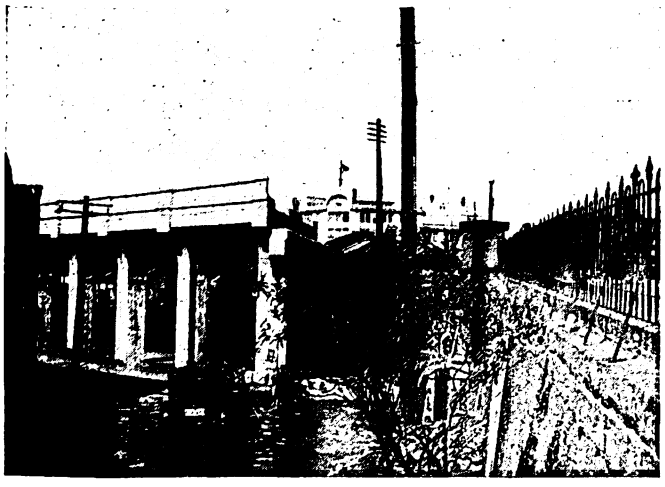
Harris, Forbes & Company, New York, have underwritten financing of a new terminal and subway project in Buenos Aires. Financing will be $12,000,000 three-year 6 per cent notes of South American Railways, which will be convertible into common stock with purchase warrants attached of the latter company. This financing, with proceeds of $2,500,000 preferred stock sold recently, will enable South American Railways to purchase $14,500,000 three-year notes of Buenos Aires Central Railroad & Terminal Company, which is constructing and will operate a subway and terminal project to give it and its interconnecting systems direct access to the heart of the business district of Buenos Aires.

✦

Rome, Italy.—Electrified lines of the Italian State Railways now number 1,625 kilometers, or about 10 per cent of the mileage of the entire state railway system. However, they carry 20 per cent of the total traffic. The use of electricity now permits the state railways to save about 600,000 metric tons of coal annually or slightly less than one-quarter of that which is burned for steam traction. During the past year, 100 locomotives were purchased by the state railway system. Of these 85 were electric.

✦

Mendoza, Argentina—The Mendoza Empresa de Luz y Fuerza, furnishing electric power, light and electric railway service to Mendoza, the fourth largest city in Argentina, has been acquired by the American & Foreign Power interests, which have concluded negotiations for the acquisition also of properties owned by the Compania de Electricidad de la Provincia de Buenos Aires in the cities of Mar del Plata, San Pedro, San Nicolas, Junin, Azul and San Luis. Mendoza, with a population of 175,000, is the metropolis of western Argentina.



A Difficult Piece of Diversion Work on the Elevated Electric Railway, Now Under Construction in Kobe, Japan

White Tile, Electric Direction Signs and Modern Lighting Fixtures Are Features of the Kobe-Arima Railway Station

Digitized by Google

PERSONAL MENTION

A. B. Paterson New President in New Orleans

A. B. Paterson, who has been vice-president and general manager of the New Orleans Public Service, Inc., New Orleans, La., has been elected president of the company to succeed Herbert B. Flowers, resigned. Mr. Paterson has already been named to the vacancy by the board of directors, and will assume his new duties immediately. No action has been taken as yet with regard to the position left vacant by Mr. Paterson's promotion.

The new president of Public Service, Inc., has been with the company for the past ten years, and is widely known in the public utility field. He entered the business in 1905 when he became connected with the Meridian Light & Railway Company, where he remained

A. B. Paterson

twelve years as vice-president and general manager.

He went to New Orleans in 1917 as representative of Henry L. Doherty & Company, operators of Cities Service Company of New York and other large utility concerns. Later he entered the employ of Isidore Newman & Sons, operating utility properties in New Orleans and other Southern cities.

In 1920, Mr. Paterson became associated with old New Orleans Railway & Light Company, predecessor of the New Orleans Public Service, Inc., as engineer in an advisory capacity, and soon after the reorganization of the company, under the name of New Orleans Public Service, Inc., was appointed general manager. Later he was elected a vice-president of the company, and last year was made a member of the board of directors.

✦

Carl H. Schildgen North Shore Industrial Agent

A new phase in an organized effort to locate new industries in the territory served by the Chicago North Shore & Milwaukee Railroad and associated lines has been entered by appointment of Carl H. Schildgen as industrial agent in charge of industrial development on the North Shore and the Chicago, Aurora & Elgin Railroad. Charles G. Finnegan has been named assistant industrial agent on both roads by Col. R. H. James, vice-president in charge of traffic.

Mr. Schildgen was formerly general freight agent of the North Shore Line and Mr. Finnegan has been actively identified with industrial development on the North Shore Line for some time.

Gorman Bennett has taken over Mr. Schildgen's former duties in addition to his own work in charge of less-than-carload freight business.

✦

Robert Ridgway to Assist in Chicago Subway Work

Robert Ridgway, chief engineer of the Board of Transportation of New York City, was appointed on July 14 chief consulting engineer of the Chicago subway. He will serve Chicago with the consent of the Board of Transportation.

Mr. Ridgway has been chief engineer of the Board of Transportation since its organization in 1924. When he became associated with the old Rapid Transit Construction Commission in 1900 in building the New York's first subway he had already achieved a record in railroad construction in the West and in building the New York City aqueduct for water supply.

His advice has frequently been sought on subway building in European and South American cities and he has made frequent trips abroad to study rapid transit. In 1927 he aided engineers in the location of the bridge across San Francisco Bay. He was also a member of the commission which picked the Boulder Dam power site. Last year he was a delegate to the World Engineering Congress in Tokyo.

✦

L. V. Johnston Master Mechanic at Peoria

Leonard V. Johnston, formerly in charge of maintenance of buses for the Peoria Division of the Illinois Power & Light Corporation, has been appointed master mechanic, succeeding A. T. Leech, deceased. Mr. Johnston went to Peoria in 1915 as maintenance man and engineer for several different power plants. In 1921 he went to work for the Illinois Traction System at the Peoria plant as maintenance man and engineer. Four years later he was promoted to the position of chief engineer. He was placed in charge of the maintenance of buses in 1929.

Mr. Johnston's career has been a varied one. In 1906 and 1907 he was in the employ of the Thomas Fee Construction Company, Chicago, building a dam across the St. Croix River at St. Croix Falls, Wis. From 1907 to 1910 he was in train service on the Northern Pacific between St. Paul and Duluth. After three years of this he worked as construction foreman for the Hydraulic Engineering Company on the building of the Keokuk dam at Keokuk, Iowa. Thence he went to Peoria.

C. D. Emmons President of the Hudson Tubes

Charles D. Emmons, formerly president of United Railways & Electric Company of Baltimore, has been elected president of Hudson & Manhattan Railroad, New York, effective on Sept. 1, succeeding Oren J. Root, resigned.

Mr. Emmons has had long experience in public utility and railroad work. Having graduated in 1892 from the University of Pittsburgh, with the degree of civil engineer, Mr. Emmons during the following nine years served in the engineering department of the Pennsylvania Railroad. From 1901 to 1903 he served as general superintendent of the Lafayette Street Railway, Lafayette, Ind., and from 1903 to 1911 was general manager of the Ft. Wayne & Wabash Valley Railway, Fort Wayne, Ind. In the succeeding four years he was with the Chicago, South Bend & Northern Indiana Railway.

In 1916 Mr. Emmons became vice-

C. D. Emmons

president and general manager of the Boston & Worcester Street Railway, and in 1918 general manager of the Boston Elevated Railway. From 1919 until his recent resignation he was president of the United Railways & Electric Company of Baltimore.

In 1922-23 Mr. Emmons was president of the American Electric Railway Association.

✦

K. D. Pulcipher in Charge of Pennsylvania Publicity

K. D. Pulcipher has been made manager of the publicity department of the Pennsylvania Railroad. He succeeds G. B. Harley, who has been appointed special assistant to the vice-presidents.

Mr. Pulcipher has been editor of the *Pennsylvania News*, Western region edition, the employee semi-monthly newspaper of the railroad. He was a staff writer for the Associated Press prior to his connection with the railroad.

Ray D. Casey, formerly special publicity representative of the Pennsylvania in Philadelphia, succeeds Mr. Pulcipher as editor of the *Pennsylvania News* in Chicago. G. E. Payne has been appointed assistant publicity manager in Philadelphia.

Digitized by Google

T. H. Tutwiler Withdraws from Active Business

T. H. Tutwiler, president of the Memphis Street Railway, Memphis, Tenn., for 25 years, and president of the Memphis Power & Light Company since its reorganization seven years ago, has resigned both of these posts as part of his plan to withdraw from all active participation in business as an executive.

Mr. Tutwiler's most outstanding contributions to the electrical industry were in the railway field, where he has been long recognized as an organizer and builder. A Southerner by birth—a Virginian—his first efforts were in that section of the country with the Georgia-Pacific Railway and the Louisville, New Orleans & Texas Railroad. From 1892 to 1901 he was engineer in charge of the larger part of the New Orleans Street Railway system. He then became associated with Ford, Bacon & Davis as engineer of the Birmingham Street Railway, and was also associated with Ford, Bacon & Davis as one of the engineers

T. H. Tutwiler

in charge of converting the railway system of the two Kansas Cities from cable to electric power. In 1903 and 1904 he had charge of the rehabilitation of the Nashville Street Railway system, being associated with Ford, Bacon & Davis in that work also.

In 1905, at the invitation of the Newman interests, Mr. Tutwiler removed to Memphis as vice-president and operating general manager of the Memphis Street Railway, of which he became president in 1906. It was through his efforts and ability that the system was placed on such a solid basis of operation that it conspicuously withstood the harassing conditions which afflicted practically all electric railway systems following the World War. He practically rebuilt the entire system of the Memphis company. On Jan. 1, 1923, at the termination of the receivership of the Memphis Gas & Electric Company, Mr. Tutwiler was made president of the reorganized company, known as Memphis Power & Light Company. He is a member of the American Society of Civil Engineers, Engineers Club of Memphis and Louisiana Engineering Association.

✦

E. L. Moore, who succeeds the late G. R. Millican as general superintendent of the Evansville & Ohio Valley Railway, Evansville, Ind., has been in the employ of the company for 22 years. In 1908 he went to Evansville from his home city of Columbus, Ind., where he was employed by the Interstate Lines. At Evansville he became trainmaster and later superintendent of transportation for the Evansville & Ohio Valley Railway.

✦

J. R. Snider Chief Operating Executive at Grays Harbor

J. R. Snider, veteran southwest Washington utility executive, is the new vice-president and general manager of the Grays Harbor Railway & Light Company. Mr. Snider, manager of the Willapa Electric Company, Raymond, Wash., for many years, will retain his position as head of the neighboring utility in addition to his responsibilities as general manager at Grays Harbor. He also will continue as active head of the Western Washington Electric Light & Power Company.

Mr. Snider has been connected with the electrical industry in western Washington since 1912 when Sanderson & Porter did development work on Willapa harbor. He became manager of the Willapa Electric Company in 1917, and has since continued in that capacity.

Mr. Snider is a native of Wisconsin. He was graduated from the law school of the University of Wisconsin, and was admitted to the bar in that state.

Mr. Snider succeeds the late W. W. Briggs as head of the electrical operations on Grays Harbor, directed, since the death of Mr. Briggs on Dec. 9, 1929, by the other officers and department heads.

✦

David E. Matthews South Shore Superintendent

David E. Matthews has been appointed general superintendent of the Chicago, South Shore & South Bend Railroad to succeed J. K. Gray, retired, effective Aug. 1.

Mr. Matthews goes to the South Shore Line with a background of more than 40 years of practical railroad experience. He was connected with the Pennsylvania Railroad for 21 years, starting as a brakeman and becoming successively freight conductor, passenger conductor, yardmaster, and assistant to the superintendent, doing special supervisory work. He has been railroad inspector and examiner for the Public Service Commission of Indiana since its creation, and with its predecessor, the old Railroad Commission since 1905.

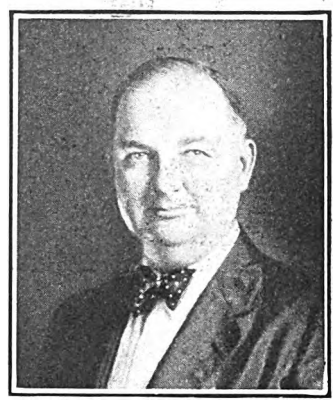
Mr. Matthews' whole career has been closely identified with railroad operation, including the investigation of accidents, handling of traffic and inspection of equipment. He has been active in the promotion of safety to passengers and employees on the Pennsylvania System and later in connection with his work for the Public Service Commission.

Mr. Gray, who is retiring, has served as general superintendent of the South Shore Line for the past thirteen years. Previously he was superintendent for six years, and assistant superintendent for one year.

W. D. Kyser Heads Memphis Utilities Including Railway

W. D. Kyser, a Memphis lawyer, has been elected president and general counsel of the Memphis Power & Light Company. His election followed the resignation of T. H. Tutwiler, president of the company since its reorganization seven years ago. Mr. Kyser also has been named president of the Memphis Street Railway, a subsidiary. He has been president of the West Tennessee Power & Light Company for nearly two years and vice-president and attorney for the Memphis Natural Gas Company. He will retain both offices. The West Tennessee Power Company is a member of the Electric Bond & Share group with the Memphis Power & Light and the Memphis Street Railway. Thus Mr. Kyser becomes the dominant figure in the principal public utilities at Memphis. He will retain his partnership in the law firm of Wilson, Kyser, Armstrong & Allen.

Mr. Kyser has practiced law in



W. D. Kyser

Memphis for more than twenty years. He was born in Richmond, Ala., on July 17, 1882, and received his early education there. He was graduated from the University of Alabama in 1903 with the degree of Bachelor of Arts. Later he earned an L.L.B. degree from Cumberland University.

Entering the practice of law in Memphis after leaving Cumberland, he became associated with the firm of Carroll & McKellar in Memphis, and, in 1909, formed a partnership with Mr. McKellar, now United States Senator.

Senator McKellar and Mayor Overton have retired from active membership in the law firm since entering politics. Judge Julian Wilson and Walter Armstrong only recently became partners with Mr. Kyser and Mr. Allen.

Mr. Kyser has made only one venture into politics—when he served as United States District Attorney for the western district of Tennessee from 1917 to 1921.

✦

L. Mackinnon, general manager of Glasgow Tramways, and F. A. Fitzpone, general manager of Edinburgh Tramways, have been elected president and vice-president respectively of the Scottish Tramways & Transport Association for the ensuing year.

Digitized by Google

H. B. Flowers Resigns from New Orleans Public Service, Inc.

Herbert B. Flowers, president of New Orleans Public Service, Inc., New Orleans, La., since 1923, has resigned as chief executive of the company, to engage in business in New York in the fall.

Mr. Flowers has been connected with utility concerns for the past 30 years. He assumed the presidency of Public Service in April, 1923, soon after the reorganization of the New Orleans Railway & Light Company, succeeding Mr. Hecht, who had been acting as president pending the selection of a head for the enterprise.

He went to New Orleans from Baltimore, where he was then vice-president and general manager of the United Railway & Electric Company. Prior to his

H. B. Flowers

Baltimore connections, Mr. Flowers had spent seven years with the electrical and transportation departments of the Detroit United Railway.

As head of New Orleans' largest enterprise, Mr. Flowers has been prominently identified with the civic and commercial life of the city, taking an active part in the work of the community chest, the Boy Scouts, and other organizations. He is also chairman of the industrial bureau of the Association of Commerce, and has actively assisted in the work of the national advertising committee of the association, having been in charge of the temporary offices opened by the organization in Chicago and in New York to establish contact with Northern industrial leaders.

✦

Messrs. Woodworth and Smith in New Vanadium Posts

C. B. Woodworth, who has been manager of the western division of Vanadium Corporation of America at Chicago, has been appointed manager of the railroad division of the corporation. His headquarters will continue in Chicago.

Walter Smith has been appointed assistant manager of the railroad division of Vanadium Corporation. He will also make his headquarters in Chicago.

Mr. Smith was graduated in mechanical engineering, Cornell University, 1909. He entered railway service with the Chicago, Rock Island & Pacific, and subsequently served the Baltimore & Ohio and the Chicago & Northwestern in various supervisory capacities.

In 1916 Mr. Smith entered the service of Pyle-National Company, Chicago, leaving this company for service in the American Expeditionary Force. After the armistice, he was associated with the Inter-Allied Railroad Commission and supervised the transfer of cars and locomotives in Germany in accordance with reparations agreements.

Upon his return to this country, Mr. Smith resumed his service with the Pyle-National Company, with which he was engaged as special representative on sales and service work until his association with Vanadium Corporation of America.

✦

Brooklyn Man to Instruct Buenos Aires Operators

Theodore Francis Kramer, instructor of motormen for the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., has left for South America to take charge of the Buenos Aires Central Railroad Company's operating force. Just previous to his departure his associates presented him with a handsome traveling bag, with all the necessary toilet requisites, a fitting reminder of their good wishes for his welfare. The Buenos Aires Central Railway is getting ready to operate its newly built subway in Buenos Aires, and asked one of the engineers of Dwight P. Robinson & Company to designate a man from the Brooklyn company who could take charge of their operative force, and give them the necessary instruction on the Westinghouse Air Brake System. Mr. Kramer was the one decided upon. He was approached and accepted the post, the Brooklyn company giving him the needed leave of absence during the temporary assignment to the system at Buenos Aires.

✦

Giuseppe Faccioli Retires From Active Service

Giuseppe Faccioli, widely known electrical engineer, has relinquished his duties as Pittsfield works engineer and associate manager of the Pittsfield works of the General Electric Company and assumed the position of consulting engineer.

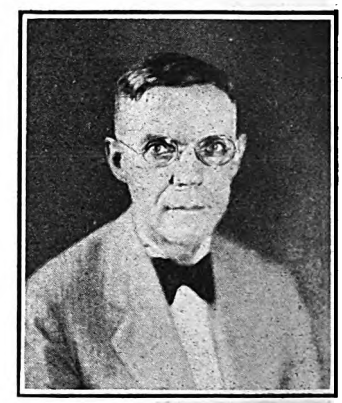
Born in Milan, Italy, Giuseppe Faccioli came to this country more than 25 years ago. He was employed by the New York Edison Company and later by the Interborough Rapid Transit Company. He then became a designing engineer for the Crocker-Wheeler Company. It was during the latter period that he met William Stanley, then wrestling with his new alternating current generator. Mr. Faccioli figured to the precise amperage which a given machine would deliver, whereas anywhere within 10 per cent would have been considered remarkable.

Soon after that he came associated with Mr. Stanley at the latter's home in Great Barrington. In 1908 he became identified with the Pittsfield works of the General Electric Company where his mathematical genius proved unusually valuable in all problems pertaining to the products of that plant, mainly transformers. Mr. Faccioli also spent considerable time at Schenectady where he was associated with the late Dr. Charles P. Steinmetz.

H. W. Smith Succeeds Late A. E. Harvey at Kansas City

Howard W. Smith, connected with the engineering and way and structures department of the Kansas City Public Service Company, Kansas City, Mo., since 1911, has been appointed to the office of superintendent of way and structures with that company, to fill the vacancy caused by the death of A. E. Harvey.

Before his entry into the street railway business, Mr. Smith was widely known on the steam roads of the Northwest. He pioneered in the survey for the Puget Sound division of the Chicago, Milwaukee & St. Paul road. He went to the Kansas City property as an assistant engineer, and served in that capacity until the organization of the



H. W. Smith

Kansas City Railways under the direction of Philip J. Kealy when he was made assistant superintendent of way and structures, directly under Mr. Harvey.

In 1926, when the Public Service Company took over the property and a city-wide program of reconstruction was started under the direction of a construction department organized for the purpose, Mr. Smith was appointed superintendent of way and structures. The construction department was placed under the direction of Mr. Harvey.

When the reconstruction work was complete in 1928, the construction department was disbanded and Mr. Harvey was again returned to the head of the way and structures department with Mr. Smith as his assistant.

Mr. Smith was born in Grand Rapids, Mich., in 1883. There he lived until 1903 when he went to Kansas City. From 1902 until 1906 Mr. Smith was actively engaged in road survey work in Missouri and in Michigan. From 1906 to 1909 he was resident engineer in the construction of the Pacific Coast extension of the Chicago, Milwaukee & St. Paul Railroad.

✦

W. C. Ludwig, superintendent of transportation for the United Railways & Electric Company, Baltimore, recently completed 50 years of service with the Baltimore system and was tendered a dinner by the line superintendents of the company. He became connected with the system as a hill-boy for the City Passenger Railway.

Digitized by Google

Chairman of Toledo Control Board Resigns

W. W. Knight, a member of the board of street railway control at Toledo, Ohio, for nearly ten years, and recently the chairman of the board, has submitted his resignation to Mayor W. T. Jackson due to his change of residence. Mr. Knight helped to draft the Milner ordinance, under which the Community Traction Company operates, and has continued to serve as one of the three members of the board ever since.

✦

Frank E. Belleville Made Secretary at Louisville

Frank E. Belleville has been elected secretary of the Louisville Railway, Louisville, Ky., to fill the vacancy created by the resignation of Samuel Riddle. Mr. Belleville will retain his position as general auditor in addition to acting as secretary.

Mr. Belleville was born in Rutland, Vt., on Dec. 18, 1883. He was connected with the Rutland Railway, Light & Power Company from 1901 to 1907, at which time he went with the United Traction Company, Albany, N. Y. He remained with this company until

F. E. Belleville

March, 1909, when he became auditor of the Schenectady Railway, Schenectady, N. Y. In 1920 he went to Louisville as general auditor of the Louisville Railway and subsidiaries.

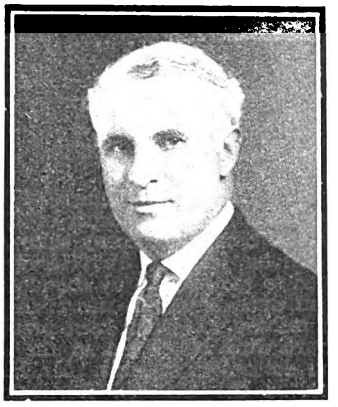
✦

J. G. Naughton in New Office With Indiana Interurban

John G. Naughton has been appointed general freight and passenger agent of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., to succeed John H. Crall, resigned.

Mr. Naughton started his railway career as secretary to the superintendent of the Lake Erie & Western Railroad at Lafayette, Ind., in 1908. He entered the employ of the T. H. I. & E. several years later as chief clerk of the traffic department. In 1929, he was made assistant general freight and passenger agent and succeeded Mr. Crall on June 1 of this year.

Mr. Naughton is a member of the storage and demurrage committee of the Central Electric Traffic Association and of the Traffic Club of Indianapolis.



R. E. Cosgrove

"Bob" Cosgrove Relinquishes Post at Springfield

Robert E. Cosgrove has resigned as superintendent of the traffic department of the Springfield Street Railway, Springfield, Mass., effective July 31. Oversight of traffic will be vested in H. M. Flanders, general manager.

"Bob" Cosgrove is known far and wide in the Springfield-Worcester district, largely because of his connection with the railways there, which began in 1906. At one time seventeen companies in the railway field were affiliated with the group with which he was identified. In his post of freight and passenger agent in charge of passenger traffic, freight traffic, tariffs, rates and other similar matters, he was for many years the contact man of the company. He has acted in the same capacity up to the present time and has made up all tariff rates and schedules of all companies with reference to fares and fare collections, and he had direct charge of trolley freight until that service was abandoned a few years ago. Mr. Cosgrove also devised and placed in operation the present system of transfers and tickets in Springfield and Worcester.

"Bob" Cosgrove was born in Winchester, Mass., Sept. 24, 1885. He was graduated from Winchester High School and Burdette College, Boston. He held a position as stenographer with the Corporation Trust Company, Boston, and entered the employ of the New England Investment & Securities Company, controlling the Springfield, Worcester and other electric railways, on Dec. 13, 1906, as stenographer and order clerk in the office of J. F. McCabe, purchasing agent.

When the Legislature of Massachusetts passed a law which forced the New Haven Railroad to divest itself of all of the electric railways in Massachusetts, the offices then in the South Station Building, Boston, were moved to Springfield. This occurred Sept. 24, 1908.

At the time of the removal to Springfield, "Bob" acted as stenographer to C. V. Wood, general traffic manager. When Mr. Wood was made vice-president of the companies, Mr. Cosgrove was appointed freight and passenger agent, in charge of passenger traffic, freight traffic, tariffs, rates, etc.

R. L. Hermann Heavy Traction Representative

R. L. Hermann, formerly transportation manager of the Southwestern district of the Westinghouse Electric & Manufacturing Company, has recently been appointed heavy traction representative, with headquarters in New York. With the exception of three years of service in the army, he has been identified with the Westinghouse Company continuously since his graduation from the University of Illinois in 1915.

✦

C. J. Roggi on Journal Staff

Charles J. Roggi has joined the staff of Electric Railway Journal as assistant editor. Mr. Roggi, a recent Massachusetts Institute of Technology graduate, directed his entire collegiate training toward the field of transportation.

His work at M.I.T. began in 1925 with his enrollment in the five-year co-operative course in electrical engineering during which he obtained about 68 weeks of co-operative practice with the Boston Elevated Railway. This practice was in the nature of a student apprentice course in which he spent some time in practically every department of the company.

C. J. Roggi

Not content with that, he attended the Harvard School of Business Administration during his last year at "Tech." There, as a special student, he took courses in traffic management and public utility management. He was graduated from M.I.T. this year with B.S. and M.S. degrees. Mr. Roggi was born in Brooklyn, N. Y., in 1907.

✦

Major James A. Fagan Retires

Major James A. Fagan, for 31 years an engineer with the Ohio Valley Electric Railway, Huntington, W. Va., and for many years chief engineer and engineer of maintenance of way of the company, has resigned. Major Fagan is now on a vacation in the West. He went to Huntington when the railway, then in its infancy, was owned by the late Senator J. M. Camden and his associates. In his early days with the company he supervised the building of the carhouses at Huntington and at Ashland and Kenova and has since taken an active part in practically all improvements carried out by the company.

Digitized by Google

Thomas Nicholl Will Succeed Mr. Scullin With Cleveland Road

Terance Scullin, veteran superintendent of buildings and equipment of the Cleveland Railway, Cleveland, Ohio, retired on pension July 31 under the company's retirement and benefit plan. Mr. Scullin has been in the employ of the railway for 42 years. He started under the late John J. Stanley when the latter was his father's assistant on the old Broadway & Newburgh Railway.

Mr. Scullin had been superintendent of buildings and equipment since 1909 and is responsible for many of the mechanical advances made by the company, including the development of the Peter Witt type of car.

Dr. George D. Upson, chief of the medical division of the accident department, will retire at the same time. He has been in the employ of the company for more than twenty years.

Mr. Scullin will be succeeded by Thomas Nicholl, who joined the research department of the company in 1929. Mr. Nicholl received his engineering education at the University of Michigan and until 1917 was superintendent of a utility property in Indiana operating in the power and railway fields. During the World War he was an infantry captain and later was superintendent of equipment of the Union Traction Company of Anderson, Ind. He is chairman of the committee on equipment of the American Electric Railway Association. He was also the first president of the Central Electric Railway Equipment Association, and is now chairman of that association's standardization committee.

Dr. J. G. Jones, who has been in the medical division of the Cleveland Railway since 1922, will succeed Dr. Upson.

Another Cleveland Railway promotion announced by President Alexander is the appointment of J. W. Kellison as assistant superintendent of buildings effective Aug. 1. Mr. Kellison was the first man employed by Colonel Alexander when the latter built the power plant for Tom L. Johnson's 3-cent fare line. He has been with Colonel Alexander ever since, serving in the executive department from 1920 to the present time.

✦

C. T. Long Succeeds J. A. Fagan at Wheeling

C. T. Long, engineer of the Public Service Company, Portsmouth, Ohio, has been appointed chief engineer of the southern division of the Ohio Valley Electric Railway. He will succeed Maj. James A. Fagan, who recently resigned. The division over which he will have supervision includes Huntington, Ashland, Portsmouth, Ironton and Wildwood, N. J.

Other changes in the personnel of the organization included the appointment of Carl J. Phipps, general superintendent to succeed Mr. Long as manager of the Portsmouth Public Service Company, a subsidiary.

Arch J. Riggell has been made assistant to the general manager in charge of transportation and Ham Adams, formerly in charge of personnel, will become sales manager.

OBITUARY

A. E. Harvey

Alfred E. Harvey, superintendent of the way and structures department of Kansas City Public Service Company since April, 1911, died on July 3. Mr. Harvey was appointed to the position by the late John M. Egan when Mr. Egan was at the head of the railway. He had been previously associated with Mr. Egan in the steam railroad work as an engineer. Mr. Harvey also served the Chicago, Burlington & Quincy, the Chicago Great Western and the Kansas City Southern roads.

When the present operators of the Kansas City railway took over the property following the reorganization there, a special department known as the construction department was established to

A. E. Harvey

take charge of a city-wide reconstruction program. Mr. Harvey was placed in charge of the new department. The Mill Street viaduct on the Dodson line—one of the city's most ornamental bridges—was also constructed under Mr. Harvey's supervision.

Mr. Harvey was the pioneer of present day track construction. Many of his experiments with steel and concrete in track work were nationally observed. He also developed many of the labor saving machines now in use on track work and paving projects. His first experiments were made on the Main Street track in 1912—the first concrete track laid in Kansas City. At that time the steel tie had not been fully developed and part of the Main Street work was poured over standard oak ties. Individual steel ties were, however, used in that portion of the Main Street track adjacent to the Union Station and on the viaducts and its approaches near the Station.

Another of Mr. Harvey's early experiments with concrete track construction was along Prospect Avenue from 39th to 48th Street. There track is constructed for half of its length over wood ties and for the rest of the distance over what is known as the twin steel tie. The surfacing of this track also introduced an innovation in construction work. This job was topped with crushed granite made from old paving blocks. For the crushing of these blocks Mr. Harvey designed a special crusher. Many of the practices of bonding the rails in city street track construction now in use were the outcome of experiments made by Mr. Harvey in Kansas City.

Mr. Harvey was also the author of many articles on track construction, and was a frequent contributor to ELECTRIC RAILWAY JOURNAL.

Mr. Harvey was born at Waverly, Ill., in 1868. He was a graduate of the civil engineering school of the University of Illinois, class of 1894. In 1893 Mr. Harvey served as assistant engineer in charge of water supply and sewers at the Columbian Exposition in Chicago.

At the time of his death Mr. Harvey was president of the Kansas City chapter of the American Society of Civil Engineers and a member of the standing committee on way and structures of the American Electric Railway Association. He was a past president of the Engineers Club of Kansas City.

✦

B. O. Brill

Byron O. Brill, general purchasing agent of the J. G. Brill Company, died suddenly in the Presbyterian Hospital, Philadelphia, on July 21, after a short illness.

Byron Brill joined the Brill company in 1898, and with the exception of six years from 1900 to 1906, when he was with the General Electric Company, at Schenectady, he has been connected with the Brill company. After having charge of lumber purchases, which department he joined in 1908, he was made general purchasing agent in May, 1922.

Mr. Brill was born on Aug. 23, 1879, at Williamsport, Pa. He was educated in the public schools of Williamsport and Philadelphia, and was graduated from the Spring Garden Institute of Philadelphia. His father, George Brill, was one of four sons of J. G. Brill, the founder of the company bearing his name.

Mr. Brill was a charter member of the Purchasing Agents' Association of Philadelphia, a member of the Academy of Fine Arts, Manufacturers Club, C. M. Swain Lodge 654 F. & A. M., Philadelphia Consistory A.A.S.R., and Lulu Temple A.A.O.N.M.S.

✦

C. W. Dickerson

Clarence W. Dickerson, vice-president and secretary of the Timken-Detroit Axle Company, died on July 1 at his home in Detroit. Mr. Dickerson was born on Dec. 28, 1859, at Brooklyn, N. Y. He was educated in the public schools of Springfield, Mass., and Brattleboro, Vt. He went to Detroit in 1910 as assistant treasurer of the Timken-Detroit Axle Company. His other business affiliations at the time of his death were vice-president and a director of the Michigan Mutual Liability Company, and a director of the Michigan Industrial Bank. For twenty years previous to going to Detroit, Mr. Dickerson was associated in executive capacities with Eastern bicycle companies.

✦

William H. McCurdy, 77 years old, one of the organizers of the Evansville & Ohio Valley Railway, Evansville, Ind., and a director in the company, died recently at San Diego, Cal.

Digitized by Google

INDUSTRY MARKET AND TRADE NEWS

Brooklyn Inaugurates Trolley Bus Service

On Wednesday, July 23, the Brooklyn & Queens Transit Corporation placed in service on the Cortelyou Road line the first trolley bus to be operated in Brooklyn. Operation is between Flatbush Avenue and Coney Island Avenue over a former electric railway route, and is in conjunction with a gasoline bus so that passengers can compare the merits of the two vehicles.

The trolley bus, which is supplied by the Twin Coach Corporation, is provided with leather-upholstered seats of the bucket type, with a seating capacity of 40 passengers. It is equipped with 50-hp. motors and has automatic control. A front entrance door is provided, with treadle-operated rear exit.

Operation on the Cortelyou Road line is of an experimental nature to enable patrons as well as the operating staff of the trolley company to make a practical test of this form of conveyance under actual operating conditions. Pamphlets describing the desirable features of the new vehicle are being distributed to passengers, and suggestions and criticisms are invited from the public.

Additions to Bates Expanded Steel Corporation

The Bates Expanded Steel Corporation, recently organized, has taken over the business of the Bates Expanded Steel Truss Company. The management is making changes in policies designed to greatly strengthen the corporation's position in its field. New designs of parallel expanded poles have been produced, and the company is actively developing a division for the manufacture of high-voltage transmission structural towers.

Judson F. Stone, of Chicago, is president of the new corporation, and Albert J. Bates, Jr., is vice-president and general manager. Mr. Bates has been closely identified with all activities of the company since 1917.

The corporation's facilities include a designing and engineering department, a large expanding and structural plant, and a galvanizing plant. Recent orders received include a large galvanized structural tower order from the Byllesby Engineering & Management Corporation for the Louisville Gas & Electric Company.

General Electric Sales at High Volume

General Electric Company sales billed for the first six months of 1930, announced by President Gerard Swope, amounted to $197,229,346, compared with $194,353,308 for the corresponding period last year. Profit available for dividends on common stock for the first six months of 1930 was $29,273,276, compared with $30,740,768 for the similar six months last year, or equivalent to $1.01 per share on outstanding common stock this year and $1.07 per share for the first half of 1929.

Valspar Expands

The Valspar Corporation has merged the Detroit Graphite Company of Detroit, Mich., and the Dominion Paint Works, Ltd., of Walkerville, Ont., with its already existing units. These two companies are wholly complementary to the other companies in the Valspar Corporation, both in the lines which they manufacture and in the location of their plants. The plans for consolidating the activities of the Detroit Graphite Company and the Dominion Paint Works with those of the other units of the Valspar Corporation do not contemplate any change in management or loss of identity in these two new subsidiaries.

The headquarters of the Detroit Graphite Company will remain in Detroit. Certain of its officers will be elected directors of the Valspar Corporation.

The Valspar Corporation now includes: Valentine & Company; Detroit Graphite Company; Cie. des Vernis Valentine; Con-Ferro Paint & Varnish Company; Dominion Paint Works, Limited; together with several subsidiary companies located both within the United States and abroad. The corporation also has plants in England and Australia.

Active Demand for Buses Among the Electric Railways

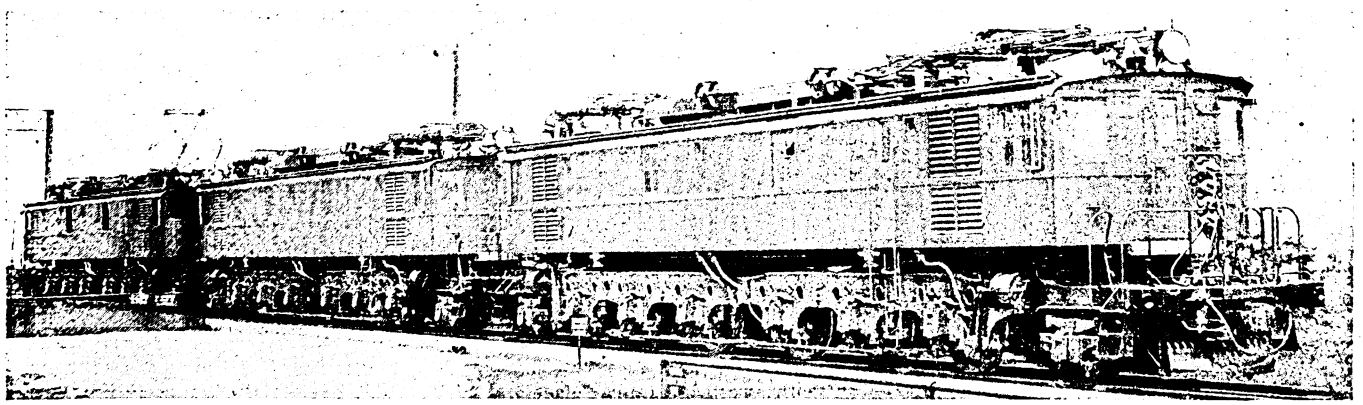
One hundred and sixty additional Type "250" Yellow buses, for which orders were placed some months ago, have been delivered to Public Service Co-ordinated Transport, Newark, N. J. The same company also received five Mack Model AB, 25-passenger buses, and three Mack Model AB, 29-passenger buses, all for city service and all equipped with gas-electric drive.

General Motors Truck Company also reports delivery of fifteen Type Z-225 buses to the Fifth Avenue Coach Company, of New York City, and ten Type "250," 33-passenger observation coaches to the Philadelphia Rapid Transit Company. Other General Motors Truck deliveries include five Type W, 21-passenger buses for city service to the Waverly, Sayre & Athens Traction Company, Waverly, N. Y.; five Type Z, 38-passenger city service buses to People's Motor Bus Company, St. Louis, Mo.; one of similar type to the Boston Elevated Railway; four Type W, 21-passenger buses, and six Type Z, 29-passenger coaches to Coast Cities Railway, Asbury Park, N. J.; and a Type W, 21-passenger coach and a Type Y, 29-passenger parlor bus to Union Street Railway, New Bedford, Mass.

Twin Coach deliveries include ten urban type buses to Schenectady Railway Company, six of similar type to Brooklyn Bus Corporation, and one to Boston Elevated Railway. Seven trolley buses were delivered to Chicago Surface Lines, and a parlor reclining bus went to the Washington Motor Coach Company, of Seattle.

Brooklyn Bus Corporation also took delivery of one Mack Model AB, 29-passenger bus and one Mack Model AC, 29-passenger bus, both of the city service type, and four Mack Model BK, 38-passenger city service buses. Mack International Motor Truck Corporation made delivery of five Model BG chassis

Electric Locomotives for Great Northern Railroad



Three 260-ton motor-generator type single-phase electric locomotives shown above are being tested for regenerative electric braking on the test tracks of the General Electric Company at Erie, Pa., before shipment to the Great Northern Railway. Four of these locomotives, practically duplicates of the four General Electric units that are now in operation on the Cascade Tunnel electrification in the state of Washington, are being shipped to the railroad.

Digitized by Google

to the Fishkill Electric Railway, Beacon.

American Car & Foundry Motors Company delivered five 40-passenger units to Boston Elevated Railway, six 23-passenger street car type coaches to the Aurora, Elgin & Fox River Railway, Aurora, Ill., and four 21-passenger parlor type coaches to the Fort Dodge, Des Moines & Southern Transportation Company, Boone, Iowa. Illinois Power & Light Corporation received three 33-passenger street car type coaches.

Boston, Worcester & New York Street Railway, Framingham, Mass., has accepted a White Model 54A bus and four White Model 54 buses. Other White deliveries include six Model 54 buses to West Penn Electric Company; one 54A bus to Washington Motor Coach Company, of Seattle; one Model 54 bus to United Electric Railways, of Providence, and one of similar type to the Los Angeles Railway.

G. E. Employees Favor Unemployment Insurance

More than 75 per cent of the eligible employees of the General Electric Company have voted to participate in the new General Electric Employees unemployment plan. In proposing this plan, under which the money will be raised by equal contributions from the employees and the company, it was stated that the plan would become effective upon an affirmative vote of 60 per cent of those eligible at each works.

Westinghouse Equipments for Detroit

The Westinghouse Electric & Manufacturing Company has received an order from the St. Louis Car Company for 65 car equipments to be placed in service in Detroit in the early fall. Forty-five of these are duplicates of similar equipment now operating in Detroit and twenty will be equipped with the Timken Model 52 truck.

Electrical Manufacturers to Exchange Technical Information

The English Electric Company announces that it has entered into an arrangement with the Westinghouse International Company and the Westinghouse Electric & Manufacturing Company whereby there will be an exchange of technical information on steam turbines and electrical apparatus. The arrangement includes the granting of licenses for the use of patents for the manufacture and sale of various products.

This arrangement gives the English Electric Company the benefit of the results of the extensive research work carried on by the Westinghouse Electric & Manufacturing Company. The technical and manufacturing link does not carry with it any control from America.

Ohmer Business Is Good

Some of the more important business received by Ohmer Fare Register Company, Dayton, Ohio, include: Sales of 146 fare registers to the Des Moines Railway and 105 fare registers to an Eastern transportation company.

New long term rental contracts have been closed with the Alabama Power Company for 37 fare registers; with the Northern Indiana Railway for 29 ticket-printing registers; with the East Penn Traction Company for 26 fare registers; with Atlantic City & Shore Railroad for 20 fare registers; with Lehigh Valley Transportation Company for 24 ticket-printing registers.

Yellow Truck Reports Good Half Year

Report of Yellow Truck & Coach Manufacturing Company, for the six months ended June 30, 1930, shows consolidated net profit of $1,437,863 after expenses and depreciation.

Consolidated income account for six months ending June 30, 1930, shows net sales of $26,963,994 as compared with net sales of $28,671,459 and $24,893,447 for the corresponding periods of 1929 and 1928, respectively. Net sales for the quarter ending June 30, 1930, were $16,233,998 as compared with $15,749,460 for the same quarter of 1929.

Paul W. Seiler, president, says: "The marked improvement in earnings during the second quarter over the first quarter reflects in large measure the influence of orders received during the first quarter. Production on these orders was well under way by the end of the first quarter, but actual deliveries were not made until the second period."

Bulletin on Electric Railway and Motor Coach Lighting

A new lighting bulletin, E-109 "Lighting Practice for Electric Railways and Motor Coaches" issued by the Westinghouse Lamp Company, contains Sections E 121-29, E 122-28, and E 123-29 of the A.E.R.E.A. Engineering Manual, reprinted by permission of the American Electric Railway Engineering Association.

Recommendations for motor coach and railway car lighting are presented in two sections, each dealing with general principles; lamps for interior and exterior lighting; fixtures and reflectors for interior lighting; head lights; accessory lighting; signal lights; illuminated signs; lighting loads; lighting plans; and wiring diagrams.

A third section contains recommendations for shop, office, and yard lighting with divisions on lamps; reflecting accessories; lighting intensities; foot candle intensities; shop lighting; car inspection pits; office lighting; yard lighting; distributed lighting; and floodlighting.

All recommendations embodied in this bulletin were compiled by A.E.R.E.A Rolling Stock Committee No. 4—Lighting, of which R. W. Cost, Westinghouse Lamp Company is chairman.

New General Electric Catalog

General Electric catalog GEA-600A, superseding all previous catalogs issued by the company, with the exception of those dealing with railway, mine and industrial supplies and merchandise products, has been issued. The book contains 1,146 pages, 8x10½ in., and is profusely illustrated.

The catalog is thumb-indexed in sixteen sections as follows: Generation, wire and cable, distribution transformers, arresters and capacitors, voltage regulators, switching equipment, switchgear, meters and instruments, lighting equipment, motors, motor applications, industrial control, transportation, industrial heating, miscellaneous, and indexes. In the indexes, products are classified both by subjects and by catalog numbers.

Electric Railway Material Prices—August, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	11.00
Lead, cents per lb.	5.25
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	5.10
Tin, Straits, cents per lb.	30.125
Aluminum, 98 to 99 per cent, cents per lb.	23.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	36.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.15
Somerset mine run, f.o.b. mines, net ton	1.75
Pittsburgh mine run, Pittsburgh, net ton	1.45
Franklin, Ill., screenings, f.o.b. mines	1.70
Central, Ill., screenings, f.o.b. mines	1.15
Kansas screenings, Kansas City	1.85

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ½ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.075
Angles bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.70
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.40

Hardware—Pittsburgh

Wire nails, base per keg	$2.15
Sheet iron (24 gage), cents per lb.	2.50
Sheet iron, galvanized (24 gage), cents per lb.	3.20
Galvanized barbed wire, cents per lb.	2.85
Galvanized wire, ordinary, cents per lb.	2.80

Waste—New York

Waste, wool, cents per lb.	10.00 to 15.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	9.00 to 12.00
Colored	6.00 to 10.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	14.4
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	0.47
Putty, 100 lb. tins, cents per lb.	5.725

Wire—New York

Copper wire, cents per lb.	12.75
Rubber-covered wire, No. 14, per 1,000 ft.	$5.05
Weatherproof wire base, cents per lb.	14.00

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.50
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	8.75
Light copper, cents per lb.	7.75
Heavy yellow brass, cents per lb.	5.25
Zinc, old scrap, cents per lb.	2.25
Lead, cents per lb. (heavy)	4.00
Steel car axles, Chicago, net ton	$15.25
Cast iron car wheels, Chicago, gross ton	13.75
Rails (short), Chicago, gross ton	14.00
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	6.25

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Editor*

Volume 74 New York, September, 1930 *Number 10*

Electric Railways Doing Well Compared to Other Industries

FOR the first six months of the present year, electric railway traffic was approximately 5 per cent below the corresponding period of last year. Compared with other industries this is a distinctly favorable showing. Statistics for the first half of this year show decreases ranging from 5 to 50 per cent in various lines of business. Among the significant decreases are the following: Department store sales, 5 per cent; coal production, 10 per cent; general manufacturing, 12 per cent; steam railroad earnings, 12½ per cent; textile manufacturing, 15 per cent; metal mining operations, 20 per cent; construction of all kinds, 27 per cent; automobile manufacturing, 31 per cent; metal working industries, 45 per cent; aircraft production, 50 per cent. On the other hand, small increases are shown in total use of electrical energy and in the food industries.

Business statistics for July show a continuation of the general downward trend of the first six months. Electric railway traffic was approximately 10 per cent below that of July a year ago. department stores sales were 9 per cent below, and general manufacturing nearly 20 per cent below. Since the beginning of August, however, there are some indications of improvement in the general business situation. Increased activity is evident in certain industries, with correspondingly increased employment. Recent reports received from a number of electric railways give reason to hope that August traffic figures may make a more favorable showing than did the July figures.

If the improvement which may reasonably be expected occurs during the four remaining months of this year, the electric railways will have suffered a less serious setback than many other industries. This is in line with experience during the business depression of 1921, as pointed out in an editorial in the November, 1929, issue of the JOURNAL, when it was predicted that a decrease in traffic of about 4 or 5 per cent might be expected during 1930. The fact that conditions in this industry were not so favorable a year ago as they were in many manufacturing industries partly explains the reason that the railways have not been more seriously affected. Nevertheless, it is evident that the basic reason for the railways' comparatively good showing is that transportation is an essential service and will be largely used, regardless of general business conditions.

Beware of Costly Economies

WITH electric railway earnings at a point considerably below normal, strenuous efforts are being made to reduce operating expenses. This is a perfectly natural reaction to the existing situation. Strict economy is necessary and undoubtedly will produce beneficial results, if not carried to excess. It must be remembered, however, that not every dollar cut out of operating expenses is a dollar gained. To save money by means that will discourage patronage or that will result in increased expenditures at some future date is poor business.

Usually the first step in reducing operating expenses is to cut the service. Under some circumstances this probably can be done to advantage, but under others it is a dangerous practice. At times when headways are short it may be possible to cut the service and continue to carry the traffic satisfactorily without long waits between cars or serious overcrowding. If cuts are made when headways are already long, the effect will inevitably be to deter people from using the service. A reputation gained now for infrequent service will remain to plague the company long after the present business depression has passed into history. There is reason to expect that in the comparatively near future the

THE PUBLISHERS take pleasure in announcing the appointment of John A. Miller, Jr., as Editor of *Electric Railway Journal*, effective Sept. 1.

Mr. Miller has been on the editorial staff of *Electric Railway Journal* since February, 1923. During the intervening years he has advanced steadily to positions of increasing responsibility and for the past year has been in charge of the editorial conduct of the paper as Managing Editor. His appointment as Editor is a merited recognition of his capacity for editorial leadership. He is qualified for his work by both training and experience, having spent several years in the employ of the Public Service Railway of New Jersey, following his graduation from the course in civil engineering at the Sheffield Scientific School, Yale University.

As a result of Mr. Miller's practical acquaintance with the problems of community transportation and his intimate contact with the field, combined with his experience as a journalist, the publishers look forward with confidence to continued service of a high order to the electric railway industry.

MALCOLM MUIR
President McGraw-Hill Publishing Company, Inc.

Digitized by Google

economy of using public transportation will appeal to a considerable number of persons who have been using private automobiles extensively in the past. To discourage this tendency by long headways would be extremely shortsighted.

Another usual method of economizing is to curtail maintenance. Here again it is important that great care should be exercised. Maintenance costs have already been substantially reduced from what they were a few years ago. It may be that further reductions can be made with safety. On the other hand, nothing is gained in the long run by neglecting the proper upkeep of the property. Maintenance practices now in effect were originally adopted because they were considered to be economical. If this idea was right then it is unlikely that money can be saved by abandoning the practices now.

Recently a number of railways have attempted to economize by dispensing with the services of certain employees engaged in so-called non-essential work. Certainly their services can be dispensed with if their work really has been non-essential. But it is well to remember that many of the jobs now deemed non-essential were originally created because it was thought worth while to have the work done. If that was true a year ago, the chances are that it is equally worth while to have the work done today.

All this is not to intimate that it is a mistake to reduce operating expenses. Where savings can be made without endangering the future it is highly desirable that they should be made. But it would be a most serious mistake to mortgage the future for the purpose of making a small saving in the immediate present.

St. Louis Should Go Ahead Now

WHETHER or not St. Louis is destined eventually to realize all of the advantages implied by the terms of the report of the transportation survey commission, that report is of more than local interest. For the sake of St. Louis, it is to be hoped that the entire plan may be carried to full fruition, but even if that is not in immediate prospect, some of the proposals should not be remote of realization. Important as is the suggestion contained in the recommendation for the construction of rapid transit lines, that proposal is overshadowed by the more immediate prospects for quick relief contained in other parts of the report.

St. Louis may have to wait for its subways, but there is no reason why it should have to wait over-long to achieve co-ordination of street car and bus service, elimination of parking, rerouting of street cars, elimination of unnecessary stops by street cars, regulation of taxis and the so-called "service cars," co-ordination of traffic control by automatic signals in the business districts, and important street widenings. The recommendation is sound that 800 new cars be purchased, half of the number to be used for replacing cars now operated. This expenditure alone would total $12,800,000. The suggestion that 11½ miles of street railway be constructed confirms the contention of the essentiality of service of this kind.

How the program would be worked out financially is not made plain in the digest of the recommendations so far made public. This, of course, is a most important consideration. As matters now stand in St. Louis, it would be impossible for the local company to meet a capital investment of the kind contemplated unless the continuity of the company financially were assured under adequate franchise provisions.

The ends sought in St. Louis—resulting in greater usefulness of the local transportation system—are the ends the managements of the local transportation agencies in all of the major cities hope to achieve. In many respects, they are civic ends more than they are company ends. No better earnest of faith on the part of the city toward the accomplishment of the purpose of the report could be given than for those responsible for the conduct of the city to proceed at once to put into effect the suggestions for immediate improvement not calling for large capital expenditures.

Principles—Not Details of Regulation Are the Concern of Congress

URGENT need exists for the stabilization of interstate bus operations. That is recognized by almost everyone who has given the matter any serious consideration. The interests of the public, the railways and the bus operators themselves all require it. While the present chaotic situation may work to the advantage of certain irresponsible operators, it is extremely detrimental to those who are endeavoring to give reliable service at reasonable rates.

Before stabilization can be effected, however, the principle of regulation must be legally established. For other types of common carrier transportation service, this principle was established many years ago. That it has not been extended to interstate bus operations has been due to a peculiar set of circumstances, rather than to the existence of any real objection to it. One of the long-established principles of this government is that no one state shall have the right to regulate interstate commerce. It was more accident than design, however, that the law which created the Interstate Commerce Commission restricted its activities to the regulation of rail and water transportation. To correct the situation thus created, legislation has been under consideration by Congress for several years. At the present time the Parker bill, providing for regulation of interstate buses, is on the list of unfinished business of the Senate. When the short session of Congress convenes in December it will come up again for consideration.

The original purpose of this legislation was to empower the I.C.C. to regulate interstate bus operation in the same general way that it has in the past regulated rail and water transportation. For practical reasons it was provided that under certain conditions this authority should be delegated to joint commissions of the states concerned. During the closing days of the past session the Senate committee on interstate commerce made a number of revisions and amendments to the bill as passed by the House of Representatives, which depart entirely from the original purpose. One of these amendments provides for more than one operation on every interstate bus route, thereby not merely permitting but practically requiring competition. Another would prohibit the merger or consolidation of a bus company with a railroad company. Still another amendment has been submitted requiring that no bus operator shall remain on duty for a longer period than eight consecutive hours. Other stipulations proposed are that every bus with a capacity for more than 20 passengers shall have a crew of two men, and that a list shall be kept of the names and addresses of all passengers carried.

Obviously a number of these amendments are entirely impracticable. Doubtless they will be contested on the floor of the Senate and some modifications will be made.

Digitized by Google

They will be subject also to discussion by the joint conference committee of the Senate and the House of Representatives, and it may be hoped that the bill which eventually emerges will be a considerable improvement over the bill as it stands today.

Regardless of the merits or demerits of these amendments, however, it is evident that they do not belong in a law of this kind. Details of regulation are not the concern of the Congress of the United States. That body should establish the principle of regulation of interstate bus operation. Working out of the details can and should be left in the hands of the regulatory commission.

Cleveland's Two-Cent Fare Zone

NO MATTER what the outcome may be, the experiment of the Cleveland Railway with a 2-cent fare in a restricted downtown section is of great interest to the industry. It is not the first effort of its kind to induce riding and to increase the popularity of the service, but it is different from most of the others. In it no account is taken of economic theories about standby or readiness to serve charges about which there has been so much discussion in the past.

Since Cleveland is under a service-at-cost plan it may be assumed that operation at the 2-cent rate will not be permitted to continue if results foreshadow the exaction of a penalty from riders in other areas. That is to say, the service must be self-sustaining if it is to continue. But even if the revenues no more than balance the cost of the service the company would stand to gain under the theory that the greater the number of people served, the greater is the civic usefulness of the railway.

The present 2-cent rate is admittedly an experiment. It is hoped that from operation under this plan data will be garnered sufficient to settle conclusively whether the proponents of the idea are right in the claims they have set up for its efficacy. The extent to which the people of Cleveland ride in the 2-cent zone would appear to be the only answer to that. If the answer is convincing the entire industry will stand to profit, not because the plan would be generally applicable, but because under conditions comparable to those in Cleveland, the zone system may offer a means of increasing the usefulness of local transportation systems.

Key System on New Financial Basis

DETAILS of the terms of the recent reorganization of the Key System Transit Company are of interest primarily to the holders of the securities of that company, but what was sought to be accomplished is of interest to the entire electric railway industry. The Key System succeeded the San Francisco-Oakland Terminal Railway. Things went fairly well with the company for a while, but then it fell upon evil days. At its promulgation the financial structure of the Key System appeared to fit the needs, but it was subsequently found to be awkward and inflexible. Mortgages containing onerous restrictions soon proved burdensome, a large floating debt accumulated and net earnings eventually were insufficient to meet the fixed charges on $20,000,000 of funded debt. In short, the company suffered not only from external troubles in the way of declining earnings, franchise burdens, excessive taxation, and other difficulties, but also from a set of internal troubles that could only be cured by a readjustment of the financial structure.

In the new financial set-up the reorganizers have gone even farther than was contemplated would be necessary by the committee of the American Association that some years ago reported on such readjustments. In a sense, the matter of physical valuation has been ignored. The effort appears to have been to bring the new financial set-up within the prospects of present earning capacity. This would seem to run counter to generally accepted theories, but those responsible for the reorganization apparently saw no other way out. Funded debt has been cut $15,500,000. The mortgages covering the properties have all been removed. As matters now stand, all of the present funded debt of $4,500,000 is in the form of equipment trust certificates. That debt is less than 18 per cent of the rate-making value. Not only that, but under the terms of the sinking fund of the new $3,500,000 equipment trust issue the company has the option of delivering to the trustee certificates of either the old or the new equipment trust issue, to meet the $431,250 of annual maturities. In other words, the sinking fund may be used to support the market. The previous equipment trust issue of $1,025,000 remains undisturbed.

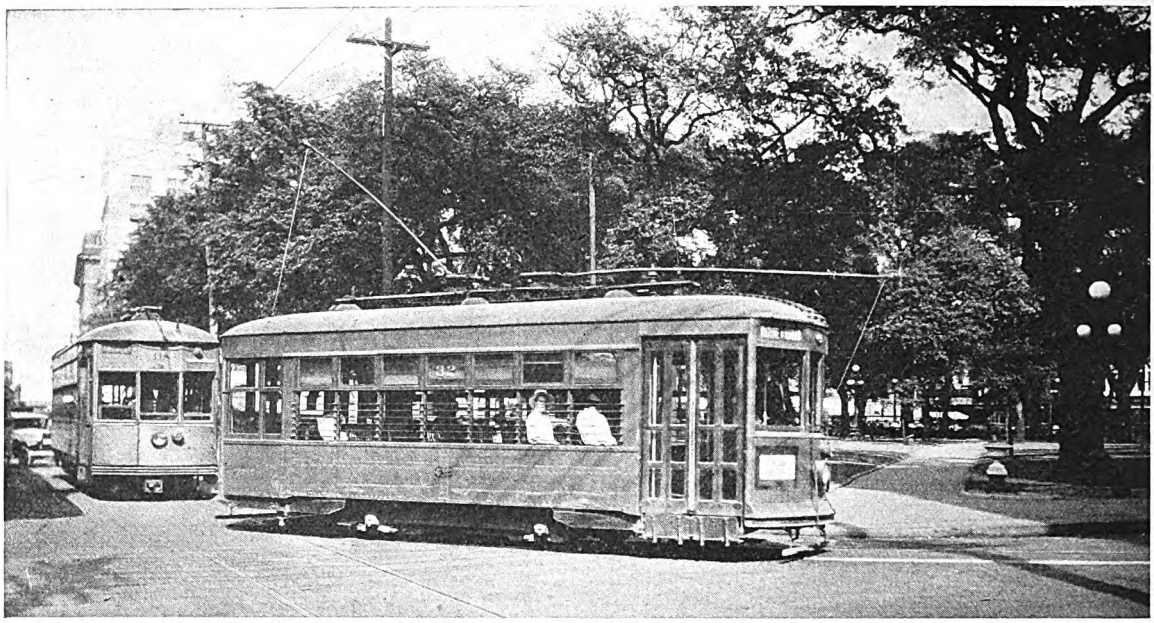
The new system starts out apparently assured beyond peradventure that all its obligations can be met. That, of course, is propitious. Security holders of the old company now are remote from anything like a fixed lien on the properties of the successor company, but the financial housecleaning, while drastic, holds out hope that eventually the present junior securities may work into a position of real worth. If they do, then those who have just made the present sacrifice will not have done so in vain.

Hitting Them in the Pocketbook

ONLY a gifted satirist could do full justice to the left-handed compliments which successful merchants frequently pay to the local transportation agencies. Again and again these men have tickled our risibilities and brought crocodile tears to our eyes by their agitation at the prospect that traffic by organized transportation agencies might possibly be removed from the streets on which they have the emporiums. While they felicitate each other on their acumen and the extent of their worldly success at the chamber of commerce meetings, Rotary Club lunches or wherever it is that such men gather, they seldom give a thought to the organized transportation agencies. But let it be even hinted that the transportation lines are to be diverted from their stores and they are not the same men. They then see nothing ahead but dark disaster.

Now to hold that these merchants owe their entire success to the accessibility of their stores to the transportation lines would not be warranted. That they do owe a large part of their success to such accessibility, however, has been established beyond a shadow of doubt. Else why would they become so panicky at the suggestion of diverting traffic away from the front of their stores? It is a nice compliment these merchants and tradesmen, big and little, pay to the organized transportation agencies by the vehemence of their opposition to practically all suggested traffic rerouting. But it would be better still if their concern for the welfare and the continuity of the local transportation service and its conduct on a profitable basis began to manifest itself before the prospect arose of their having their own pocketbooks flattened.

Digitized by Google



Service in Mobile is given by rolling stock maintained at a high standard. Thirteen new cars similar to the one in the foreground have been purchased in the past three years

Mobile Bids for Patronage with

Clean Cars, Close Headway *and* Smooth Track

By

CLIFFORD A. FAUST

Assistant Editor *Electric Railway Journal*

CITIES with a population of 100,000 and under are passing through a crucial period of their transportation history. No one denies this fact. Studies of their problems over the past two years by the small-city committee of the transportation and traffic association have revealed a number of common causes for their troubles. Unsatisfactory financial set-ups, competition from the privately owned automobile, a trend toward walking when service is not sufficiently frequent, inadequate fares, excessive taxation and other burdens, a feeling that the street car is an obsolete form of transportation and competition from unregulated taxicabs and jitneys have all contributed in some measure toward the present difficult situation.

To combat these unfavorable factors many cities have made real and definite progress. By frank and open discussions they have secured relief from unreasonable franchise requirements, they have modernized their rolling stock as extensively as possible, they have improved service by speeding schedules and operating as many cars as the traffic will justify, they have intensively cultivated public relations and by modern merchandising methods and active solicitation of patronage have made real progress. And their efforts have not been in vain. Almost every small city that has assumed an aggressive attitude in meeting its problems has improved its status.

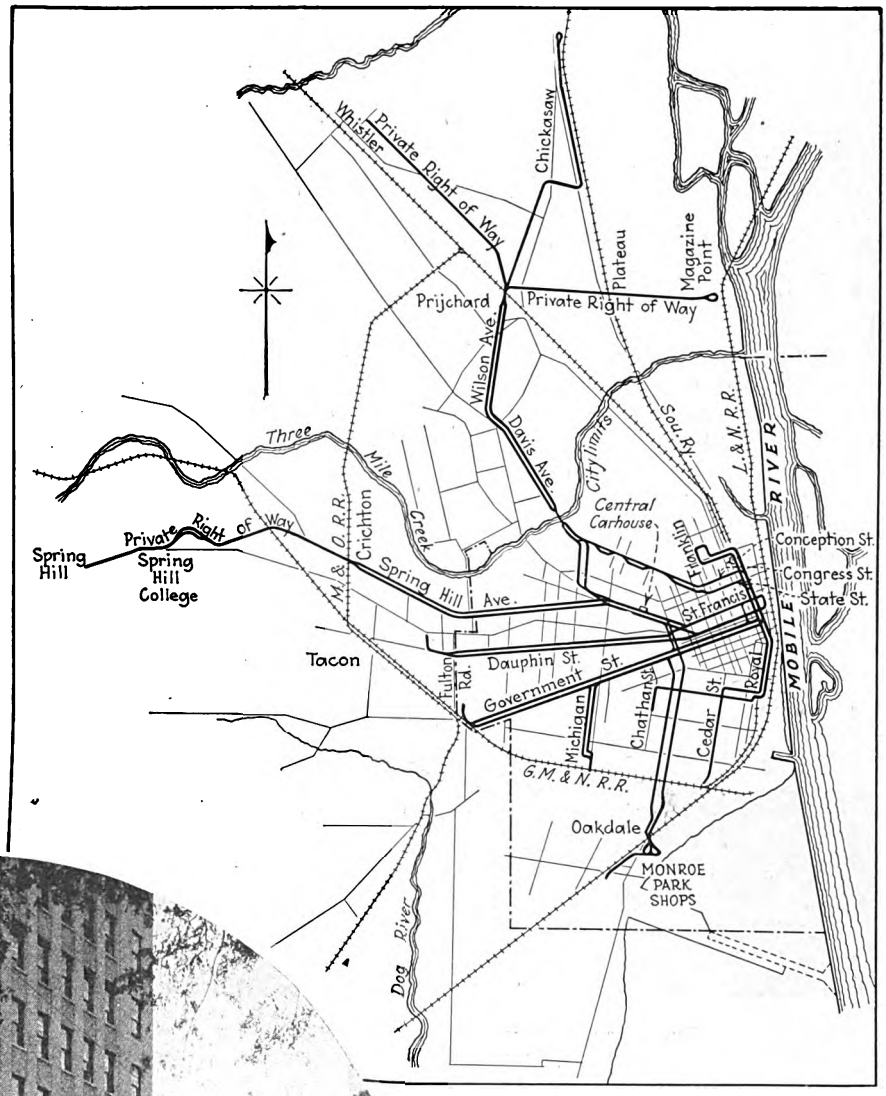
In the southern part of Alabama, one of these cities is doing many notable things not only to retain its prestige but also to move definitely forward. It is Mobile, a city of approximately 75,000 population, and served by an independent electric railway, the Mobile Light & Railroad Company.

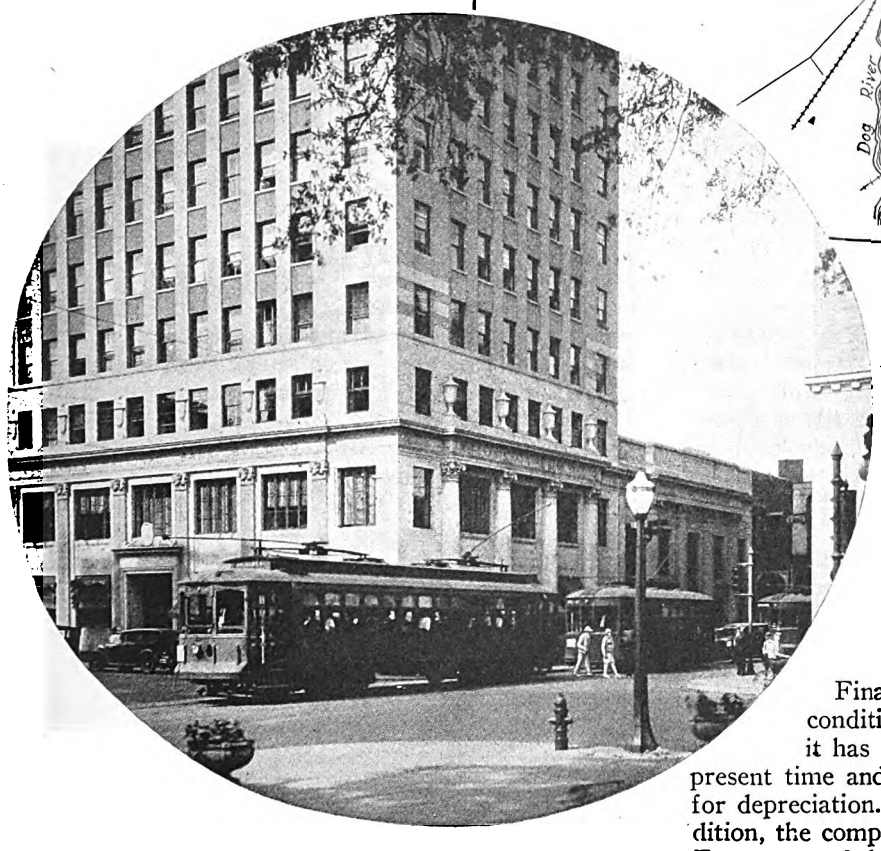
Digitized by Google

Extensive rehabilitation of physical plant, accompanied by many other steps to improve service and better public relations, has placed the system in a favorable position

An analysis of the local transportation situation in Mobile reveals that many of the unfavorable factors present in most small cities also exist there, but that the railway has singled out each individual one, and, through careful studies of the problems, has taken definite steps to solve them.

Among the favorable aspects of the Mobile situation, however, there is one which stands out above all the rest. It is the unbounded optimism of the management and the excellent *esprit de corps* all through the organization. Both J. H. Wilson, president of the company, and F. F. Rossman, vice-president and general manager, have faith in the city of Mobile and in the transportation system they manage. They know that Mobile is an industrial city, that the South is making great strides in its industrial activity, that the city is growing steadily and that a reliable system of transportation is a vital part of this great center. They have faith in the city to the extent that they are continually improving the railway service. This same spirit is apparent in the other officers of the company, in the shop employees and in the men on the cars.





Eleven lines of the Mobile Light & Railroad Company effectively serve all parts of the city. The three lines to the north and the Spring Hill line to the west have private rights-of-way in the suburban areas

At left is a view in the business district of the city showing one of the double-truck cars used for suburban service and two city cars

Financially the company is in very sound condition. It has never been in receivership, it has only a small bonded indebtedness at the present time and has allowed a large amount each year for depreciation. In retaining this sound financial condition, the company has not neglected its physical plant. Every part of the system has been well maintained.

Only recently the company received seven new single-truck cars of modern design. This order followed one for six cars of a similar type which were placed in service 2½ years ago. All of the other cars are kept in as attractive condition as possible. The rolling stock of the company is painted and overhauled every 30 months, so that the cars always present a good appearance.

Digitized by Google

One of the greatest assets of the company is its extensive mileage of new track and the small mileage of single track on city lines where two-way operation is necessary, 0.75 mile, to be exact. The city of Mobile has been repaving its important arteries over the period of the past eight years and has included almost every street on which the electric railway has car lines. In all of this work the company has joined in rebuilding its track with a smooth, permanent type of structure. Its power distribution system, likewise, has been modernized.

Particular pride is taken by the company in its maintenance facilities and standards. A modern car shop; a well-arranged carhouse, equipped for light repairs; the use of the work order system of maintenance; the establishment of high standards, and the employment of an experienced and interested group of shop men have all contributed to the improvement of the equipment and the reduction of maintenance cost.

Another favorable factor for the company is that it is faced with no bus, jitney or taxi competition. A

The executive offices and trainmen's quarters are located in this building on Spring Hill Avenue. The well-arranged carhouse at the rear is designed for storage and light repairs

few interurban bus lines serve the city, but they are not permitted to carry local traffic.

Even though the company does not have any mass vehicle competition, it has altered its routes to serve the city more efficiently and to eliminate any duplication of service. By abandoning certain short portions of its route and building new track, it has eliminated unnecessary mileage, without impairing the service.

Fast Schedules Maintained on All Lines

On three lines, extending into suburban districts on the north, and on one line extending west, private right-of-way is used. High-speed, limited service is given at frequent intervals on these lines and schedules distributed to inform the patrons of the leaving times. One of the limited cars on a county line makes only four stops in the outlying district and then runs express the remaining distance. On the 7-mile trip ten minutes is saved. With this schedule the car reaches the city in less time than automobiles. Business has increased to such a volume on this line that the company is considering adding trailers. On all its lines, the company is maintaining as close a headway as possible. To accomplish this it is steadily increasing the number of car-miles and car-hours operated. Last year, for example, the company operated 2,180,412 car-miles, as compared with 2,160,525 in 1928, an increase of 19,887. Car-hours in 1929 were 1,223 in excess of the number operated in 1928. The management realizes that in a city the size of Mobile a great number of people walk to the business center if a car is not in sight, and therefore offers the maximum service to the public. The importance of this is emphasized by the fact that the maximum ride in Mobile is 24 minutes and the average ride is approximately 15 minutes. Studies of traffic and walking distances are constantly being made by the company to ascertain whether or not the schedules are satisfactory. Rush-hour headways on residence lines now range from 5½ to 8 minutes. Along with shortening headways the company has increased its schedule speeds. City lines now average 8.92 m.p.h. and county lines 11.50 m.p.h.

At present the company receives an 8-cent cash fare and sells four tokens for 30 cents. During 1929 the average fare per revenue passenger was $0.0753. This figure is the result of a steady increase in the fare over a long period of years.

Two very valuable assets of the company are its excellent public and employee relations. The company boasts of a very clean court record, evidence of the favorable attitude of both the public and the attorneys toward the electric railway. Special care is taken in answering inquiries of patrons and giving consideration to suggestions that are sent in. The company also advertises civic events and programs of numerous organizations on its cars.

Employee relations in Mobile are exceptionally good, no major labor troubles having developed. Group insurance is offered to those employees who desire it. Although no extensive safety campaign has been conducted, talks on the subject are given frequently enough to keep the employees alert to the dangers of careless operating. This is stressed not only for the operators, but also for all the other men employed. The company has made its Monroe Park shop almost 100 per cent safe by proper installation of machines and use of many safety devices.

At regular intervals talks are given the trainmen on neatness, courtesy, efficient operation and merchandising. These have aided considerably in improving the work of the men and in stimulating them to sell the service.

Every attempt is being made by the company to lower its operating expenses. A gradual change-over from two-man to one-man operation has taken place, so that at the present time only two county suburban lines are using two men. A detailed analysis of all expenses by departments is made monthly and followed by lectures to the superintendents on ways and means of reducing costs.

Digitized by Google

The superintendents, in turn, instruct their men in a similar manner. By careful purchasing and paying for all materials and supplies outright the company has been able to reduce costs to a minimum.

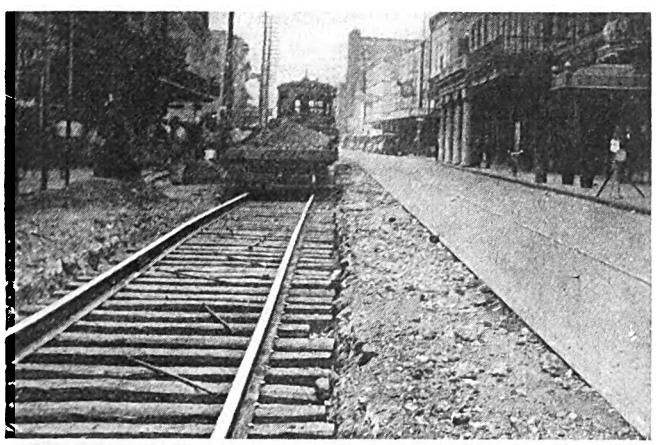
Probably the biggest handicap to the Mobile railway system is the psychology of the public with regard to riding on street cars. Although in several parts of the country this feeling has developed, probably in no part has this psychology developed to such a detrimental state as in the South. Mobile, like many other cities in the southern states, has suffered a loss in riding partly because of this attitude. Of course, the private automobile is the greatest competitor of the railway and is responsible for much of the shrinkage in patronage. It has harmed the railway not only in removing the actual drivers from the street cars, but also in picking up prospective patrons and in congesting the downtown streets, slowing up car movement. A rather unusual problem of the company has been the necessity to rebuild track which was in excellent condition. It is likely that the company will have heavy paving burdens for the next ten years.

Thirteen New Cars Purchased

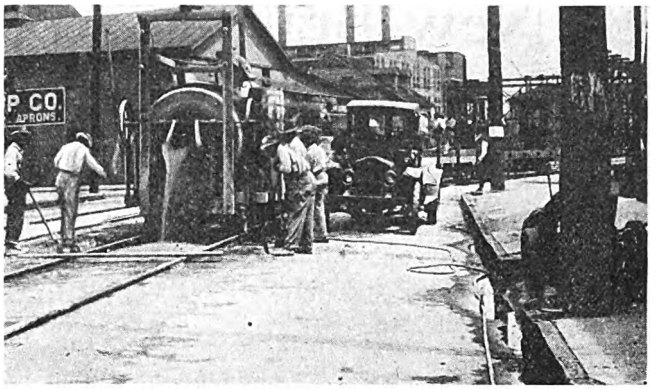
In its program of rolling stock modernization the Mobile Light & Railroad Company bought six single-truck, Birney one-man cars in 1927 and seven more in April of this year. Of the latter order four were built by the Perley A. Thomas Car Works, High Point, N. C., and three by the American Car Company, St. Louis, Mo. The cars seat 33 passengers, weigh 20,500 lb., are equipped with all safety devices and are designed for double-end operation. Double folding doors at the front, an exit at the rear for colored patrons and a very wide aisle permit a rapid exchange of passengers. The wide aisle has the great advantage of allowing the colored patrons entering the front to pass the white passengers without contact.

In the past seven years the railway has rebuilt approximately eight miles of track. By years the reconstruction was 1.444 miles in 1923, 0.982 in 1924, 0.2699 in 1925, 0.547 in 1926, 0.756 in 1927, 0.885 in 1928 and 2.943 in 1929. For 1930, the figure will total about 0.818 mile. Only 2.355 miles of streets with car tracks within the city limits remain unpaved. It is expected that within the next year or two they will be hard surfaced also.

A very interesting type of construction has been employed in rebuilding all of the company's tracks. A 6-in. coarse slag ballast is surfaced with a 3-in. layer



An extensive program of track rebuilding during the past eight years has included a large proportion of the city lines



Pouring concrete over the ties, preparatory to laying the paving surface

of fine slag ballast. On this 7 in. x 8 in. x 8 ft. creosoted pine ties are laid on 2-ft. centers. Dirt is filled in on top of the 3-in. layer to the top of the ties, extending the full width of the ties. This is well tamped and then covered with a 5 or 6-in. layer of concrete, the depth depending on the type of paving surface used. An outstanding feature in the construction is the pouring of concrete underneath the rail section between alternate pairs of ties, made integral with the top layer of concrete. The slabs are 16-in. wide and extend to the same depth as the ties, 7 in. This type of construction ties the base definitely to the rail, so that if there is any movement the pavement and rail will move together. As a result no paving breaks have occurred or are anticipated. T-rails of 82-lb. section, 7 in. in depth, or 7-in. girder rails of 103 or 122-lb. section are used in the construction. The company has approximately 4,400 Thermit-welded joints at present and is expanding this number, as all new construction will have this type of joint.

Work Order Maintenance System Effective

Much of the effectiveness of the shop department is due to the use of a work order system. Before any maintenance can be performed a work order sheet must be filled out, stating the nature of the work, the materials required and the estimated cost of both materials and labor. The system has aided materially in reducing costs and in improving the efficiency of the shop employees. All cars are inspected on a 1,000-mile basis and completely overhauled and painted every 30 months at the Monroe Park shop.

An efficient layout at the Central carhouse reduces car movements to a minimum and permits rapid storage and dispatching. Sixteen tracks, extending the full length of the yard, are served by a single ladder track at each end. These ladders are so joined to the two tracks on the adjoining avenue that one can serve as an entrance only and the other as an exit. Eight of the tracks pass through the carhouse and have 172-ft. pits for inspection and light repairs. Fronting on Spring Hill Avenue is the main building with the company's offices, trainmen's quarters and a shop.

Summing up the situation in Mobile, we find that it has problems similar to those encountered on other properties of comparable size, and that it is taking definite action to combat them. The company officials have an optimistic outlook, the financial condition of the company is sound, its rolling stock is well maintained, its track is in large part new, the service has steadily been improved and the company enjoys an excellent state of relations with its public and employees.

Digitized by Google

New Braking Apparatus Demonstrated

BEFORE a group of more than 50 electric railway officials and manufacturers from all over the country, a demonstration was given on Aug. 14, at Pittsburgh, Pa., of a new type of braking apparatus developed by the Westinghouse Traction Brake Company. This apparatus, called a "traction booster," was installed experimentally on car No. 4936 of the Pittsburgh Railways. It combines features of the familiar air brake and of the magnetic brake, and, at the same time, overcomes some of the limitations of those two systems. While the air brake is extremely flexible it is limited in over-all effectiveness by the adhesion between wheel and rail, so that, under the most favorable conditions, the stop obtained with a street car is about two to three times as long as the best automobile stop. The magnetic track-shoe brake to a certain extent is less dependent upon rail friction, and, when used in conjunction with an effective air brake, provides a shorter stop than can be obtained with the air brake alone. The main limitations of the track-shoe brake are its relative inflexibility and the high maintenance of its track-shoe mechanism.

The "traction booster" consists of two magnets on each truck which are spring-suspended $\frac{5}{8}$ in. above the rail. When the brake cylinder pressure exceeds a predetermined value, a switch is automatically closed, thus energizing the magnet coils. The magnets do not come in actual contact with the rail, but exert a magnetic pull on the rail which, in effect, increases the weight of the car. The increased adhesion between wheel and rail, resulting from the magnetic pull, permits the use of a higher retarding force without danger of wheel sliding. On the demonstration car, which weighs approximately 44,000 lb., the magnetic effect amounts to 6,000 lb. per truck, a total of 12,000 lb., which represents an increase in adhesion of 28 per cent. The booster itself produces little retarding effect, its function being to increase the adhesion to such an extent that higher brake cylinder pressures can be used safely. In this way, the full flexibility of the air brake is retained, and the higher rate of retardation made possible by the booster need not be used unless desired.

In the tests, stops were made at retardations of 4 m.p.h.p.s. without the booster and 8 m.p.h.p.s. with it. Those at 4 m.p.h.p.s. were intended to show what can be accomplished through present standard air-brake devices, with some consideration for the truck and car body members with respect to ability to withstand the forces employed. For this purpose a braking ratio of approximately 138 per cent was used.

The stops accomplished at a retardation rate of 8 m.p.h.p.s. required the assistance of the traction booster. The braking ratio was 275 per cent, based on the actual car weight of 44,000 lb. and was approximately 215 per cent based on the effective weight of 56,000 lb. The practical use of a braking ratio of 215 per cent was possible because of the fact that the rails were sanded and a retardation controller was employed to reduce the peak of retardation which occurs at the instant of stopping.

The retardation controller consists of a cylindrical weight moving freely between rollers in a tightly sealed case, but held in balance or neutral position by opposing springs at each end. If the retardation exceeds a predetermined value the weight moves, and in doing so opens a valve which in turn reduces brake cylinder pressure. The friction characteristics of cast-iron brakeshoes are such that unusually high friction occurs at very low speeds, such at at the instant of stopping. This causes a surge or jerk in the car, and in view of the unusually high forces employed, would be objectionable unless controlled in a manner as indicated.

Results of these tests are shown in the following table:

Results of Braking Tests without and with Booster

Retardation of 4 M.P.H.P.S.				Retardation of 8 M.P.H.P.S.			
Speed M.P.H.	Dist. Feet	Time of Stop Sec.	Ret. M.P.H.P.S.	Speed M.P.H.	Dist. Feet	Time of Stop Sec.	Ret. M.P.H.P.S.
10	20	2.4	4.1	10	13	1.3	7.7
20	65	4.6	4.3	20	41	2.4	8.3
30	160	7.2	4.2	30	93	3.6	8.3

The apparatus installed on the demonstration car is in purely experimental form and does not represent a commercial design. It was demonstrated merely to show the possibilities of equipment with retardation rates of 8 m.p.h.p.s., as well as the effect on car body and trucks of these high retarding forces necessarily applied, viz., a braking ratio of 275 per cent.

Guests attending the braking demonstration were also afforded an opportunity to inspect car No. 4731, which has been equipped with a new type of trucks. These trucks have been developed jointly by the Westinghouse Company and the Pittsburgh Railways. They are designed for four 50-hp. motors, WN drive, and 22-in. wheels. Dynamic braking is provided, as well as air-operated drum brakes on the axles. The truck members are welded together, and a substantial saving in weight has been effected.

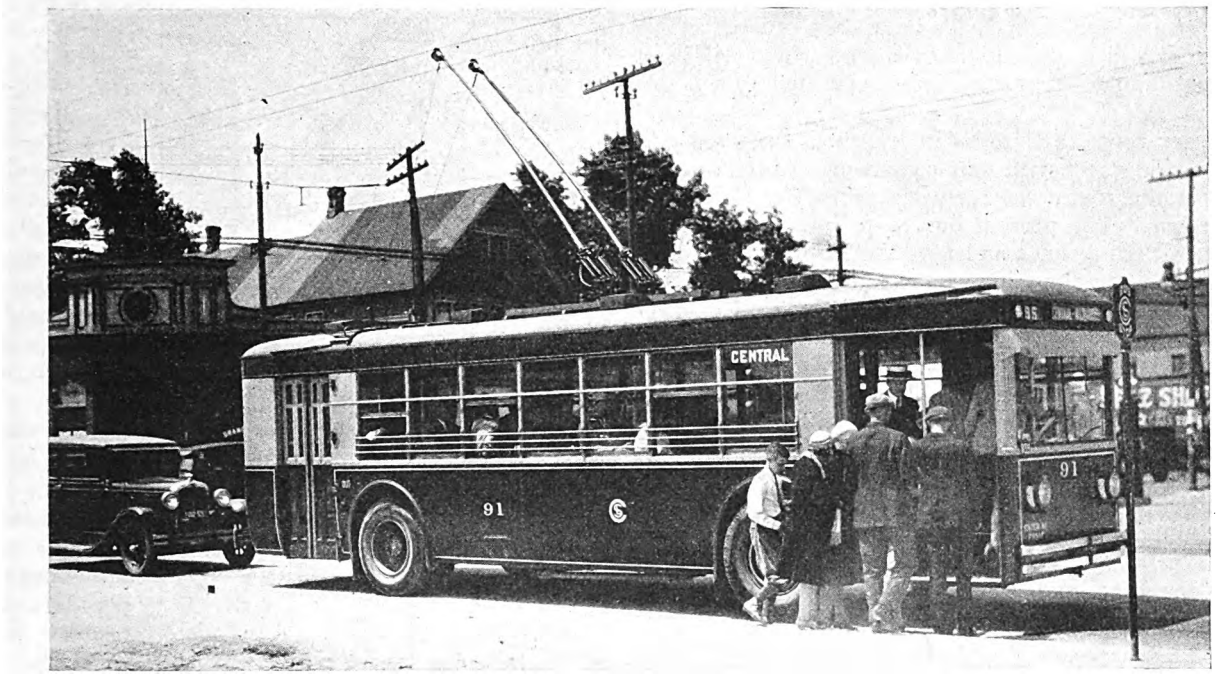
A.I.E.E. to Revise Standards for Control Apparatus

STANDARDS for railway control apparatus have been made the subject of a report issued by the standards committee of the American Institute of Electrical Engineers. This is a tentative revision of the present Standard No. 16 printed under date of July, 1925. The report is not considered by the committee as being final, but is presented with the hope of obtaining opinions, criticisms and suggestions of all parts before it shall be approved.

The report presents the accepted definitions of all control apparatus and equipment as used under specified service conditions. It follows with the standard definitions of the various kinds of ratings and the manner in which they should be expressed. Temperature limitations of coils, resistors and other parts, and, also, limitations other than those due to heating are defined. The report also describes the various classes of insulation and the standard methods of making temperature determinations and dielectric tests.

The principal changes suggested in this report concern the definition of the limits of temperature rise for coils and mechanical parts, and the determination of the mean temperature of a copper winding by measurement of its resistance when the resistance at some reference temperature is known.

Digitized by Google



Trolley buses on Central Avenue, Chicago, are operating more than 3,000 miles and carrying nearly 30,000 passengers per day

Operating Statistics Prove

Success of Trolley Buses

in Chicago

Popular approval has warranted extension of this type of service. New equipment recently ordered will bring total number of vehicles to 70. Schedules, traffic and operating costs discussed in a paper presented before the Wisconsin Utilities Association.

By

F. A. FORTY

Superintendent Schedule and Traffic Department
Chicago Surface Lines

RECENT rapid developments in trolley bus design have placed this vehicle beyond the experimental stage. The developments in light-weight, high-speed motors, automatic control, large capacity light-weight bus bodies equipped for circulating loads, pneumatic tires and excellent riding qualities have made the trolley bus a vehicle which is headed towards widespread adoption. The successful installation of the trolley bus in Salt Lake City, the more recent large scale installation in Chicago and elsewhere have demonstrated that this vehicle has great possibilities in the transportation field.

Trolley bus service was first inaugurated in Chicago on the Diversey line in the northwest section of the city on April 17, 1930. Additional trolley buses were subsequently placed into operation in the same section of the city on the Central Avenue, Narragansett Avenue and Elston Avenue lines on June 8, June 29 and July 1, 1930, respectively. These operations, together with the operation of three lines using gasoline buses, were the result of a decision by the Illinois Commerce Commission dated March 6, 1930, directing the withdrawal of Chicago Motor Coach Company buses from the northwest section of the city and directing the Chicago Surface Lines to establish bus service as extensions of its rail lines in this territory.

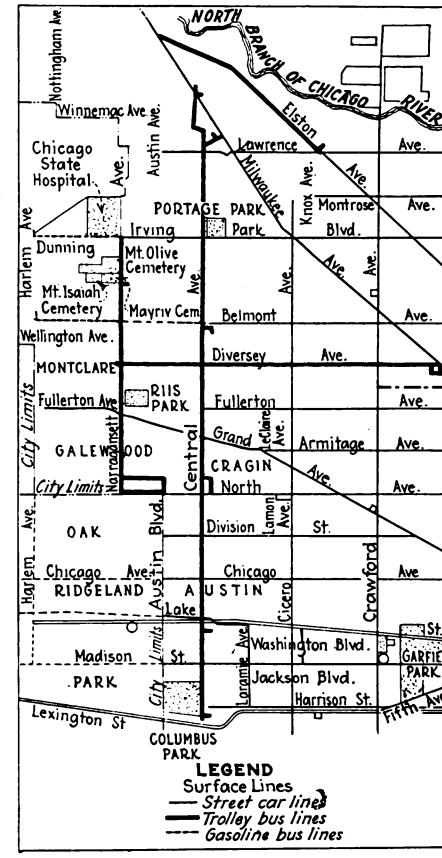
The original order for trolley buses totaled 41 vehicles, of which 29 were built by Twin Coach Corporation, six by Brill-American Car Company, and six by the St. Louis Car Company. Within a few weeks after service was started, additional trolley buses were needed and the fleet was increased to 55 by the purchase of seven Twin Coaches and seven Brills. Recently seven more

Digitized by Google

Twin Coaches and eight Brills have been ordered. This latest order will be delivered in September and will bring the total number of trolley buses operated in Chicago up to 70.

Diversey route, 3.81 miles in length, is operated over a fairly wide street with new pavement. Approximately 1 mile of the route was formerly served by a one-man rail car line. The present bus route intersects two important rail trunk lines and taps the Milwaukee Avenue line, which is the most important and heaviest rail trunk line on the northwest side. A wye at the west end and a loop at the east end serve as terminals. The line does a thriving business, inasmuch as 19,400 riders are handled on a normal weekday. The average number of riders carried per vehicle-mile amounts to 9.58, while the average number per vehicle per day amounts to 1,140. Seventeen trolley buses are required to operate the line. A 2½-minute headway is operated during the rush hours, when the maximum passenger flow reaches 1,370 in the heaviest half hour. A 6-minute headway is maintained during the base, and a 6⅔-minute headway during the evening. In spite of the difficult conditions, relatively high speeds are maintained. The speed between terminals ranges from 11.72 m.p.h. during rush hours for the direction of heaviest travel to 13.05 m.p.h. during the base. The all-day speed between terminals is 12.33 m.p.h.

Central Avenue route, which is 6.98 miles in length, is an important north and south line arranged with wyes at both terminals. Poor pavement in the north section where an 18-ft. strip in the middle of the street has been left unpaved, a narrow bridge with a 17-ft. roadway, and a 1.75-mile stretch of rough pavement where the roadway width is only 28 ft., have all imposed severe operating conditions on this line. The route does a large volume of business, carrying 29,500 riders on a normal weekday. The density of riding is quite high, since the rides per vehicle-mile amount to 9.45. Twenty-five trolley buses are required to operate the line during rush hours, when a 3.15-minute headway is maintained. A 6.4-minute headway is maintained during the base and a 7¾-minute headway during the evening. The speeds maintained between terminals are relatively high, considering the poor pavement and narrow street widths. The speed ranges from 11 m.p.h. during rush hours for the direction of heaviest travel to 11.97 m.p.h. during the evening. The all-day speed is 11.47 m.p.h.



Four heavy-duty extensions to rail service are being successfully operated with trolley buses in the northwest section of Chicago

The number of riders carried per vehicle-mile on these two lines shows that the service is well patronized. The 40-seat buses used on both lines are used to full seating capacity at the heaviest loading points along the line during non-rush periods. During rush hours the average number of passengers per bus at the heaviest point along the routes is now 60. The additional buses to be acquired for these routes will reduce this to 55, which is a more satisfactory rush-hour standard. The wide double door for the front entrance and exit and the rear door exit permit effective circulation of passengers. On the Diversey bus route the average length of stop is short, varying from five seconds during the midday to 7.2 seconds during rush hours. The rear door exit is used to great advantage during the rush hours, as 25 per cent of the total passengers alighting use this exit. Street men also use this exit door for loading passengers at concentrated loading points.

Operation of the trolley bus in Chicago has shown that this vehicle is capable of easily maintaining speeds

Operating Statistics of the Chicago Trolley Bus System

	Diversey Avenue	Central Avenue	Narragansett Avenue	Elston Avenue
Distance between terminals	3.81 miles	6.98 miles	3.50 miles	2.86 miles
Number of buses used during morning rush	17	25	6	4
Number of buses used during base	7	13	5	3
Number of buses used during afternoon rush	17	25	6	5
Number of buses used during evening (8 to 10 p.m.)	7	13	5	3
Average inbound morning headway in maximum half hour	2.50 minutes	3.15 minutes	6.75 minutes	7.25 minutes
Average headway during base	6.00 minutes	6.40 minutes	8.00 minutes	9.00 minutes
Average outbound afternoon rush headway in maximum half hour	2.65 minutes	3.15 minutes	6.75 minutes	6.00 minutes
Average headway during evening (8 to 10 p.m.)	6.66 minutes	7.75 minutes	7.80 minutes	9.00 minutes
Scheduled speed inbound during morning rush	11.72 m.p.h.	11.00 m.p.h.	11.66 m.p.h.	13.70 m.p.h.
Scheduled speed outbound during morning rush	13.05 m.p.h.	11.33 m.p.h.	12.72 m.p.h.	14.90 m.p.h.
Scheduled speed inbound during base	13.05 m.p.h.	11.65 m.p.h.	12.72 m.p.h.	14.90 m.p.h.
Scheduled speed outbound during base	13.05 m.p.h.	11.65 m.p.h.	12.72 m.p.h.	14.90 m.p.h.
Scheduled speed inbound during afternoon rush	12.70 m.p.h.	11.33 m.p.h.	12.72 m.p.h.	14.90 m.p.h.
Scheduled speed outbound during afternoon rush	11.75 m.p.h.	11.00 m.p.h.	11.66 m.p.h.	13.70 m.p.h.
Scheduled speed inbound during evening	12.70 m.p.h.	11.97 m.p.h.	13.10 m.p.h.	14.90 m.p.h.
Scheduled speed outbound during evening	12.70 m.p.h.	11.97 m.p.h.	13.10 m.p.h.	14.90 m.p.h.
Scheduled speed all day	12.33 m.p.h.	11.47 m.p.h.	12.64 m.p.h.	14.38 m.p.h.
Maximum hourly passenger flow during morning rush	1,370	1,257	455	280
Maximum hourly passenger flow during afternoon rush	1,370	1,235	433	665
Total daily rides	19,398	29,533	6,362	4,426
Total daily vehicle-miles	2,026	3,128	1,102	841
Average number of rides per route-mile per day	2,544	2,114	910	774
Average number of rides per vehicle-mile	9.58	9.45	5.78	5.26
Average number of rides per vehicle per day	1,140	1,284	1,060	886

Digitized by Google

of 12 m.p.h. on busy routes in outlying territory. Speeds as high as 15 m.p.h. can be reached where the density of travel is not too great and where operating conditions are quite favorable. It has been found, however, that this commendable speed performance of the trolley bus does not exceed the speed performance of the modern one-man rail car with the same conditions of operation, volume of business and number of stops per mile.

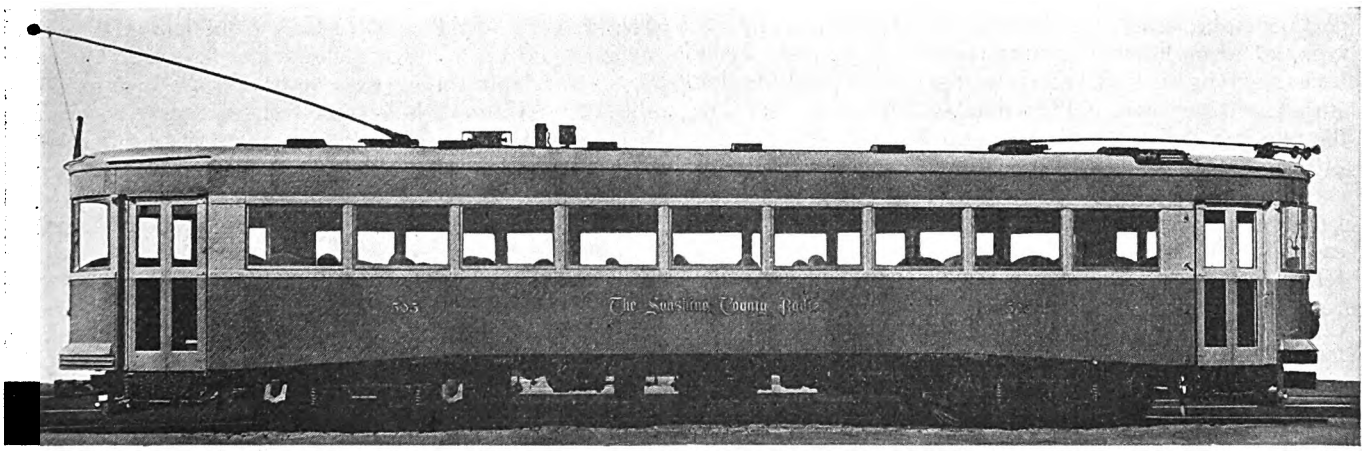
The operation of the trolley bus on our present routes provides a higher quality and a more economical brand of service than would be possible with gas bus operation. The lower energy and maintenance costs on the trolley bus reduce the operating expenses approximately 5 cents per bus-mile. This saving produces a marked operating economy and does much toward wiping out the fixed charges incidental to the investment in trolley structures. On the Chicago system, trolley bus operation will show a saving over gas bus operation on any average headway up to fifteen minutes. At that frequency the total cost of operation for the two forms of transportation will be the same.

Introduction of the trolley bus in the transportation field has aroused a great deal of speculation as to where and when it should be used. No ready formula can be set up to determine its adaptability on any route in any city. Individual routes within a given city vary greatly in the volume, character and distribution of the riding throughout the day. Transportation companies differ from one another in standards of service, construction standards, labor costs, and in working agreements with the trainmen which affect the cost of operation to a great extent. The trolley bus can be used in a very large city only to a limited extent. On our property, 82 per cent of our total car service is rendered on lines where the rush-hour traffic requires a rail car headway varying from 2½ minutes down to one-half minute, and a non-rush hour headway varying from six minutes down to two minutes. Modern rail car operation on this 82 per cent of the system gives better and more economical service than would be possible with the trolley bus.

Probably the trolley bus will play an important part in the local surface transportation system of many cities. In a large city it can be used to supplement the rail car operation by serving outlying and other districts where the volume of traffic will not support rail car operation. In medium-sized cities it can be used to supplement principal rail car arteries and serve outlying districts. In smaller cities it may be more economical to serve the principal routes with trolley buses and the outlying routes with small-capacity gas buses.

Modern Design

Features Windsor Cars



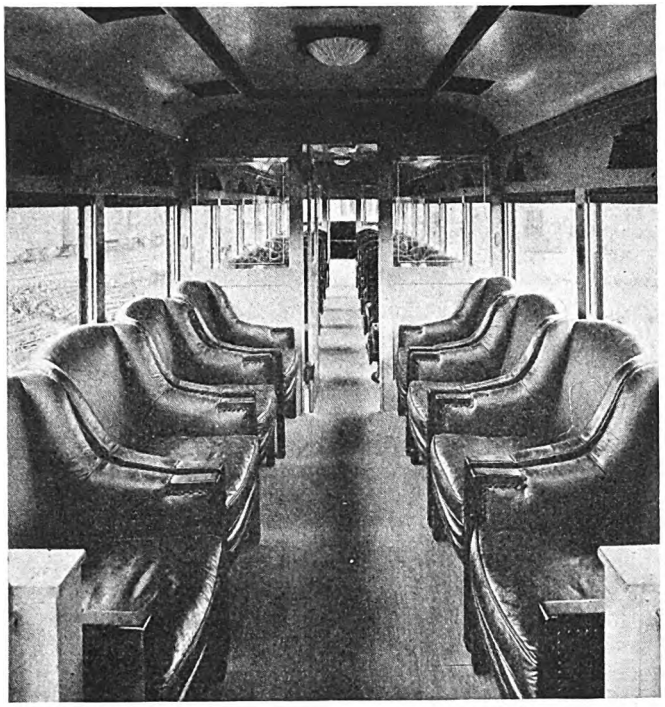
Attractive features are found in the motor and trailer cars just delivered to the Windsor, Essex & Lake Shore Railway

FOUR motor cars and a trailer of special design have just been put in service by the Windsor, Essex & Lake Shore Railway, operated under the supervision of the Ontario Hydro-Electric Railways. These cars, which include the most advanced design of interurbans in Canada, represent to a large extent the ideas of W. R. Robertson, general superintendent, working in conjunction with the Ottawa Car Manufacturing Company.

The bodies of the five cars are of the same dimensions, being 51 ft. 2 in. long over anti-climbers and 37 ft. 8 in. over body corner posts. The width over side sheathing is 8 ft. 3⅛ in., and the width over vestibule corner posts is 7 ft. 7⅜ in. From the rail to the top of the roof the height is 11 ft. 2⅜ in., and from the rail to the top of floor it is 3 ft. 5 in. The framing is of steel.

The motor cars are arranged for double-end operation, being fitted with an electro-pneumatically operated door and folding step at each corner. There is a main compartment with 40 seats and a smoking compartment with ten seats. In the main compartment the seats are arranged transversely on each side of an 18-in. aisle. They are of the semi-individual bucket type, upholstered in plush. All except the end seats are reversible. In

Digitized by Google



Observation compartments of the new Windsor cars are luxuriously furnished

the smoking compartment, on each side of the aisle, there is a leather-upholstered settee for five. The lighting is by ceiling dome fixtures along the center line, five in the main compartment and two in the smoking room.

The design of the trailer is special. It has seats for 50. There is a central main compartment with 28 seats, and at each end an observation room which, including the vestibule, is about 15 ft. long. The side window sash are 42 in. long by 30 in. high. In the main compartment the seats are of the semi-individual bucket type, of deep double spring construction, with 24-in. backs, arranged transversely. They are plush upholstered. At one end of the car tables are placed between the two end seats and the adjoining ones.

The observation room, or solarium, at one end of the car has on each side a settee with plush-upholstered seats for five. The room at the other end of the car has on each side four large chairs upholstered in plush, and a settee upholstered in hand-buffed Spanish leather conforming to the semi-circular vestibule end.

In each motor car the operator's compartment is partitioned off from the main body of the car, and there is a wood and glass partition between the main compartment and the smoking room. In the trailer both observation compartments are partitioned off from the main compartment.

The cars have interior finish of birch mahogany, and the exteriors are finished in blue with yellow trim.

The motor car trucks have 33-in. wheels carrying 100-hp. Westinghouse motors. HL control is used, the controller being lowered to the floor at the operator's position so as to bring the top to a convenient height.

Considerable thought was given to the design of the cars to secure good appearance, comfort for passengers and economy in operation, and to afford the road's patrons something original in the way of passenger equipment. The design provides a pleasing appearance, with the streamline effect much in evidence. The large windows and the window guards arranged to drop into pockets in the car sides add to the appearance. Vestibule door openings have a set of double doors for the winter season. Both inside and outside doors are operated by the same engine.

Making Sleep Easy on the Interstate

MODERN coil spring mattresses have been adopted as regular equipment for lower berths on the all-steel sleeping cars operated between Indianapolis and Louisville by the Interstate Public Service Company, thus keeping pace with the latest developments in sleeping car equipment.

The mattresses were especially designed to fit the extra length berths of the Interstate sleepers, which are 4 in. longer than in standard Pullman cars.

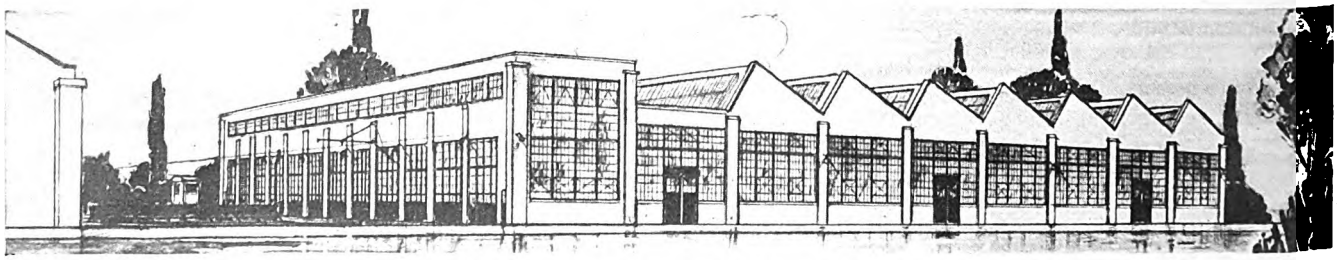
The new mattresses are 4 in. thick and consist of rows of 3-in. coils compressed to a height of 2 in., a layer of woven hair, and a 2-in. layer of hair padding. Each of the coils is set in an individual canvas pocket.

New Shop Unit Begun in Chicago

CONTRACTS for construction of the second unit of the Chicago Rapid Transit Company's shops at Niles Center were let on Aug. 11 and ground broken for the structure on the following day. The first unit, the paint shop, was built three years ago. The new unit, which will cost $375,000, is 200x252 ft. in outer dimensions. It is being built directly south of the first unit at Oakton Street and Hamlin Avenue, and will be used as a construction shop for repairing and remodeling cars.

The building will be rushed to completion as rapidly as possible so that work may be started on remodeling cars to make them suitable for eight-car train operation, the longer trains being necessary when the consolidation with the Surface Lines is effected and the transfer system between the "L" and surface lines inaugurated.

The complete plans for the Rapid Transit Company's shops call for the construction of ten units at a total cost of $4,500,000, covering an area of ¼ mile square. When all completed the shops will be capable of handling a total of 4,500 cars, with a storage capacity in the yards for 350 cars.



Architect's drawing of the second unit, recently started, of the Chicago Rapid Transit Company's Niles Center car shop

Digitized by Google

UTILITY VALUATION

Demands Logical Treatment

Physical property is the basis of the utility, and its real value fluctuates but little in its ability to render service. Its value in terms of the dollar, however, changes with purchasing power and must be determined from time to time

By

JOHN W. BURKE

Consulting Engineer
New York City

UNDER our law, rate making is a function of the legislative branch of the government. Rates must be made by authority of the State legislatures or of Congress. Although in the early days there were numerous cases in which the legislatures and the incorporators of new utility companies agreed on the rates to be collected and had them expressed in the charters, it soon became manifest that the legislatures could not themselves arrive at fair rates, and especially that they could not directly exercise their power to supervise and regulate the public utilities. Hence, about the beginning of this century, many of the states organized public service commissions, and those which formerly had them increased their scope, so that for years past these commissions have administered the duties of regulation and rate making through the powers delegated to them by the legislatures.

This work of the commissions has proved to be as difficult as it is important. Some may permit too large a depreciation reserve in those prosperous utilities that can collect it. On the other hand, they are sometimes inclined to adopt a method of valuation which confiscates a portion of the company's property in arriving at a rate base. This error is due to a misconception of World War effects. The popular impression is that one effect was to increase costs, whereas the real result was to depreciate the currency. Bearing in mind the purchasing power of the dollar, only a few items of construction or equipment cost substantially more now than in the decade before the war, but this fact is not generally recognized.

Just as real wages differ from money wages, so do real costs of construction differ from the costs in current dollars. Even when money wages are constant, real wages may fluctuate considerably from adventitious causes, such as climatic conditions affecting wheat and other food supplies, and speculation in various commodities. Not so with real construction costs. They have a unique record of stability.

Real cost of construction, outside of engineering, legal and overhead costs, is properly measured in foot-pounds of energy expended by manual labor, machinery or fuel. The energy necessary is the same one century as another. Nor is there any marked fluctuation in the money cost of construction measured in a stable currency. The progressive economies resulting from improved manufacturing and transportation methods, and from substituting power and machinery for manual labor, are substantially offset by the higher wages paid the remaining manual labor. We are inclined to divide construction between materials and labor, the latter including only labor in the field. But the materials delivered are comprised almost wholly of labor, including mining and transporting the ore, building the railroad and cars on which it is transported, mining and transporting the fuel that smelts it, rolling or drawing the smelted iron and copper, fabricating it into machinery, loading and conveying it to the point of delivery.

Labor's Share in Profits Increases

For many generations the share of labor in the fruits of industry has been increasing, and it must continue to increase. The net result has been a slight upward trend in construction costs, and this must continue unless our civilization becomes static, or the labor-saving devices in the future prove more decisive than those of the past.

The popular impression that present construction costs are far in excess of pre-war costs is due to the fact that they are measured in new dollars worth only 60 to 70 per cent of the former dollars. And to this also is due the popular fallacy that property is enhanced in value, and especially that a utility is freely given a new and fictitious value, when all that happened was to translate one set of dollars into another set of the same aggregate intrinsic worth. It goes without saying that courts and commissions should have a sounder philosophy than that commonly prevailing among the public.

Error in "Prudent Investment" Theory

If it were possible to ascertain the original costs of a property constructed and installed under honest and efficient direction, and these costs were translated into present dollars, we should have the present "prudent investment" in that property; and that investment would be the same as the present reproduction cost new. But the popular application of the "prudent investment" method of valuation, which in some quarters it is proposed to use in a popular formula, involves the error noted in the preceding paragraph. The method of its

Digitized by Google

leading proponents is to try to find, for example, the number of dollars originally invested, say, in 1900 and add the number of 90-cent dollars invested in 1910, the number of 50-cent dollars in 1920 and the number of 65-cent dollars in 1930, along with all the intermediate systems of dollars, and call the numerical sum of these the present investment in dollars. This is not the only difficulty with the "prudent investment" method. The Interstate Commerce Commission reports show that in only a few of all the cases examined was it possible to find the original cost or "prudent investment" in any kind of money. If the Interstate Commerce Commission, with its extensive staff, cannot find these amounts there is little promise that the state commissions will be more successful. As might be expected from commission members who have given deep study to this special problem, only a few give countenance to the illogical application of the "prudent investment" theory.

As a practical matter the differences between "prudent investment" and "fair value" could be reconciled by a little clear thinking and precise expression. The investment is not cash; it is the physical property dedicated to the public use. We need not speculate as to how many dollars the bondholders, the stockholders, the contractors or others furnished the company to enable it to place the property in service. We need not make a doubtful attempt to find what premiums, commissions or discounts were paid to, or what losses were suffered by, the various people who made it possible to render this service. The only parties to the public contract are the company and the public, and what is used by the one party in serving the other is precisely the physical property. There is nothing speculative about that. Anyone can see it, and note its extent and condition.

The actual investment at any given time is resolved into the dollars of the time by taking an inventory of the physical property and pricing it for reproduction cost new, then deducting such depreciation, if any, as is proper in the circumstances. Always it is the property itself that is the investment, and the best place to look for it is not in the books of account but on the ground.

While "prudent investment" and reproduction cost new should be substantially the same amount, it does not follow that either can be assumed as the fair value. As a matter of law and good judgment, the "fair value" may be more or less than the investment, depending on the circumstances in each case. It is subject to determination by the courts and commissions, and not by others.

Province of the Court in Valuation

One of the most disturbing conditions in this country is the unfriendly attitude of the public toward valuation by the courts. Frequently a commission decision is reversed by the courts. If this happens in the federal instead of the state court the irritation is further increased.

But in general there is no appeal from the commission to the court except on a grave charge—that of confiscation. And unless confiscation is proved, the commission cannot be reversed. Where does the fault lie? With the court which performs an unpopular duty, or with the commission which has not been so careful? It is the prerogative of the commission to make the rate. In doing so it must find the value of the property. It is only on an authentic showing of confiscation that any court can assume jurisdiction.

The Supreme Court is the final interpreter of law in the United States, and in certain contingencies for the several states. Certain engineers and commissions and some of the courts are insistent in their request that the Supreme Court establish a formula for valuation, or at least apportion the weight that should be given to reproduction cost as compared with the other factors to be considered. The answer to this request may be found in the decree of the court delivered by Chief Justice Hughes, then an associate justice, on the Minnesota Rate Cases in 1912:

> The ascertainment of that value is not controlled by artificial rules. It is not a matter of formulas, but there must be a reasonable judgment having its basis in a proper consideration of all relevant facts.

We see no good reason why the court should be expected to reverse that principle, and little prospect of its further expansion or elucidation. In so intricate a problem as valuation the "reasonable judgment" of trained and competent arbitrators would seem a safer guide than an inert formula. A general principle expressed by a tribunal of such character as the Supreme Court should be applicable to conditions of the distant future as well as of the present, and through periods of either deflation or inflation.

Supreme Court Decisions Based on Smyth vs. Ames

The relevant facts to be considered were first set forth by the Supreme Court in Smyth vs. Ames, 169 U. S. Certain things were specifically listed but the need for including other elements was recognized as follows:

> In order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to pay operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property. What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience. On the other hand, what the public is entitled to demand is that no more be exacted from it than the services rendered it are reasonably worth.

Although Smyth vs. Ames is taken as the comprehensive basis for valuation methods which may have general application now and in the future, it is important to note that for present or immediate use it is specifically affected by more recent decisions.

The basic case, Smyth vs. Ames, was decided about 30 years ago. For the next fifteen years the cost of construction rose so slowly and so uniformly that the reproduction cost did not vary sharply from the original cost of property constructed within that period. A similar condition has existed for the past eight years. There may be longer periods in the future when original costs and reproduction costs will be virtually the same. And in the future also, under commission regulation, it may be feasible to ascertain original costs with a greater degree of accuracy than in the past. But if part of the property was constructed or installed before the war and other parts during or after the war there can be no direct comparison between original and present costs as expressed in the dollars of their respective times. Later decisions are consistent with Smyth vs. Ames.

As to the request for a formula, and for the weight

Digitized by Google

to be given present reproduction cost, the Supreme Court has clearly stated that there can be no formula, and that reproduction cost has controlling but not exclusive weight in the reasonable determination of the present fair value which must be taken as the rate base. There seems to be no need for any further rule. With the radical change in money values caused by the war, it does not appear how any reasonable interpretation of Smyth vs. Ames could arrive at a different conclusion.

The slow and laborious part of finding present value is taking the inventory. This work could be placed by the commission on the utility, where it belongs. The pricing of the inventory by the commission staff and the finding of fair value by the commission should involve but little time and expense. Where the inventory already has been taken, as in the case of the steam railroads, it is simpler to affix the present unit prices for the entire property, and thus obtain an approximate basis for present fair value, than to apply pre-war prices on part of it and various other prices on other parts, with a final result clearly out of harmony with the legal requirements of the situation.

It should be noted that while the legislative branch establishes rates it looks to the judicial branch for the rule of valuation on which those rates are based. Thus in the Transportation Act of 1920, supplementing the Interstate Commerce Act with nineteen paragraphs designated as Section 15a, paragraph 4 provides as follows: (1) it requires "due consideration to all the elements of value recognized by the law of the land for ratemaking purposes"; (b) warns against giving undue weight to the property investment account or original cost; and (c) finally directs that "the value so ascertained shall be deemed by the commission to be the value." It does not attempt to prevent review by asserting that the courts shall deem it to be the value.

Notwithstanding that the steam railroad inventories already in the files of the Interstate Commerce Commission could be quickly priced and extended to afford a basis from which to find the present fair value, the commission early in 1930 recommended to Congress a complete revision of Section 15a to obviate finding the value by the above method, and a bill has been introduced in the Senate for that purpose. The proposed revision contains a feature hardly less important than the process of valuation. It provides that such part of the excess earnings of the prosperous roads as under the present act may be applied by government to the aid of the weaker roads shall be used by the prosperous roads themselves for extensions, improvements and reduction of debt. This constitutes a rich concession to some of the Class I railroads. It may induce that group to reach a compromise with the commission which would preclude appeals to the Supreme Court. But for the other railroads and for public utilities in general it does not appear that the valuation laws as hitherto interpreted by the courts could be affected materially by the new method.

The proposed revision omits going concern value, an element almost universally recognized as part of the valuation for rate-making purposes. The decisions declare that it always exists but is hard to measure. To set it at zero is a genuine innovation. In the attempt to measure it, the first body rendering a decision has a certain advantage, as was strikingly expressed by that brilliant lawyer and tactician, the late Judge C. A. Prouty, in an argument before the Interstate Commerce Commission on Jan. 7, 1930, speaking as director of the valuation bureau:

> Going value might be even more difficult. How are you going to determine what shall be added? The fact that a thing is difficult does not excuse you from attempting to do it and you also enjoy this advantage, that if you will just simply *do* it, without undertaking to say precisely how you did it, nobody can ever find any fault with it. That will absolutely end it.

The advocates of the "prudent investment" theory assert that once the valuation is determined by that method it can easily be kept up to date by accountancy—showing the net property additions and deductions from time to time. That is probably true. It certainly is true while construction costs continue the even tenor of the last eight years. But this condition is not a function of "prudent investment." It is entirely independent, and prevails to the same degree if the valuation be by the present inventory method. In fact, it is all very easy and simple, except finding the first valuation in those cases where the rate-making bodies insist in effect that pre-war dollars and present dollars are the same.

Frequent Valuations Not Necessary

An outstanding misconception is the idea that under the "present fair value" method frequent valuations are necessary on account of the constant fluctuation in prices. As a matter of fact, the ordinary undulation up and down leaves the net value substantially unchanged unless or until a new plateau of costs is clearly established. Generally speaking, there are only three causes for a valuation. First, an improper rate in the beginning; second, a substantial change in net revenue from operation; and third, a cataclysm resulting in a radical change of currency. Valuations are not, and cannot be, so refined as to correct for lesser aberrations than these. "Prudent investment" would avail not.

John W. Burke

THIS STUDY and the one on depreciation to be published in a forthcoming issue are based on Mr. Burke's experience of about ten years in the valuation of utility and industrial properties, and that in turn on more than fifteen years experience on their construction.

Following graduation in the civil engineering course at Worcester Polytechnic Institute, Mr. Burke was engaged four years as an assistant engineer, and during the next ten years he was successively chief engineer on the design and construction of several properties including railroads, electric railways, dams, power plants, wharves, warehouses, municipal water supplies, sewers and pavements. He also had architectural experience.

For a number of years he was on the staff of large engineering organizations as a consulting engineer and superintendent of construction on public utility and industrial properties. He also examined and reported on numerous engineering projects and existing properties in this country and abroad, and prepared estimates of their costs and earnings. As president and general manager he operated an urban and interurban electric railway for six years.

Digitized by Google

In the older utilities the rates adopted at the beginning were sometimes haphazard for lack of experience. On this rather accidental method the 5-cent car fare was adopted. And it happened on the average to be fairly satisfactory until the World War reduced the old 5-cent fare to about 3 cents. But there were many special cases where power costs, length of haul, density of population, plan and topography of the city, varied widely from the average, and in some of these cases attempts to change the fare necessitated finding a valuation for the first time on the property in question.

Changes in net revenue result, of course, from variations in patronage and in costs of operation. These in large volume seldom occur suddenly, but throughout a series of years may become so substantial as to require redress.

The third cause—great changes in the value of money—occurs most infrequently. The world has witnessed only two major phenomena of this character in more than 100 years, those due to the wars of Napoleon and to the recent World War. The Civil War in this country was another event of the same kind, but not of world-wide influence. The belief is groundless, therefore, that changes in currency require frequent valuations, and that this could be obviated by the "prudent investment" method.

There are two other important influences on money values, but these operate so slowly as not to necessitate frequent valuations. First is the increase or decrease in gold supply. Second is the economy resulting from mass production. Thus the only sudden change in money value is due to a great war. Once that is settled an early displacement of values need not be expected. A valuation properly made after the currency has reached a new and fairly steady level, need not be remade in the near future.

The present fear of frequent valuations probably was induced by recent experience in abnormal times, when we witnessed in numerous cases two or more valuations of the same utility within ten years from the beginning of the war. The reason we have had more than one valuation from World War conditions is that we did not accurately discount these conditions. In 1918 it was generally estimated that post-war costs would stabilize at about 40 per cent above pre-war, whereas the increase has been double that, and in 1920 was even more. Despite the teachings of history, many of the courts and commissions refused to make adequate allowance for the new currency, and some of them cherished the delusion that pre-war costs were the eternal standard to which we must shortly return. Early official valuations based on these errors had to be corrected by subsequent ones.

Although a valuation properly made, after the currency is stabilized, can be kept approximately up to date for many years by accountancy under engineering direction, it should not continue indefinitely without a revaluation. Constant minor fluctuation in prices may in the course of years result in a substantial net change above or below those prevailing when the valuation was made, and there likewise may be an accumulative error in the new property accounts. Just as there is an ill-defined twilight zone between maintenance and depreciation, there often is a doubt as to the exact capital charge in retiring elements of property. The only accurate check is a revaluation, which automatically corrects the inventory, the change in costs, and the errors in accountancy judgments.

To arrive at "present fair value" under our law, depreciation must be considered. Although it seems illogical to deduct accrued depreciation from the fair cost of a public utility to find the rate base, the principle has been so well established by decisions that it must be accepted. In theory, a public utility property is dedicated to the service of the public. That property is the investment, which should be kept intact and uniform by maintenance and replacements, comprising part of the operating expenses paid by the public served. It seems inconsistent that any accumulation of these operating expenses should be deducted from the capital investment, and that thereby an amount be arbitrarily taken from the investor without any fault or omission on his part.

But as the courts direct that the utility valuation shall add for actual appreciation of the property, they require also that actual depreciation shall be deducted. Presumably this legal consistency is wise and prudent. It may be asserted that it has a further justification as applied to public utilities. It may be in the interest of a sound public policy that even a property that can collect no depreciation from its patrons be charged with a nominal amount of accrued depreciation as a spur to keep it in good operating condition; so that a property with deferred maintenance, from any cause, would not be allowed its full investment. It should be remembered that exact justice seldom can be had here below; substantial justice is all that may be expected.

It is positively stated by the Supreme Court in the United Railways & Electric Company of Baltimore vs. Harold E. West et al., Jan. 6, 1930, that depreciation, like the rate base, must be predicated on present value, and not on the so-called cost, meaning the cost expressed in dollars of the time of construction or installation. From the decision it is clear that depreciation is an operating expense. It should not be deducted from the rate base except for the special reasons hereinbefore stated. In any event, the depreciation fund is not intended to restore the property to newness. The Baltimore decision twice states that the purpose is "to maintain the level of efficiency for the public service."

Finally, the Supreme Court in the Baltimore case completes the logical requirements of equitable rate making by providing for some surplus earnings, which are necessary to maintain the financial credit of any industry, public or private, and which are dictated by sound business management.

Commission Regulation Practicable

It has been charged that regulation of public utilities by commission has failed. As well might we say that it has not been tried. From the recent report of the New York special legislative committee and from other evidence the public begins to realize that the problem of regulation is not merely one of good business judgement and legal knowledge, but is largely technical. This latter character has not been recognized sufficiently, and as a natural consequence only a small proportion of the commissioners were appointed for their technical training, and the commissions generally have not been clothed with the authority, or provided with the necessary funds, to procure an adequate engineering staff.

In many of the states it has been customary to select the commissioners from men prominent in public life. They are thus likely to possess tact, patience and knowledge of human nature, all indispensable qualifications, which, however, may be found in others who in addition

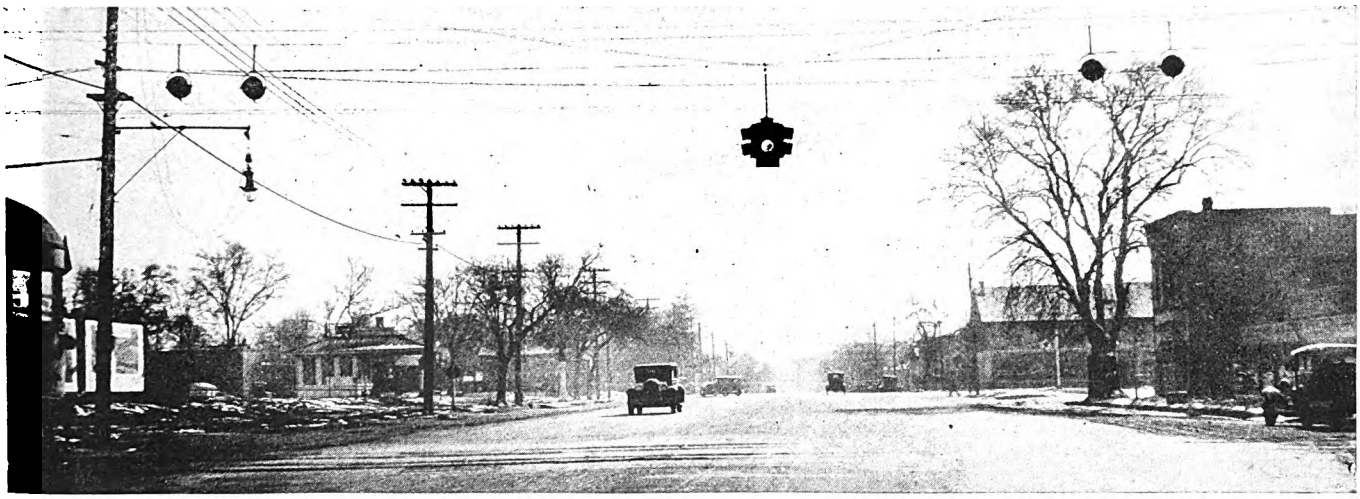
Digitized by Google

are equipped by special training to cope more effectively with questions of valuation and rate making. It would be a long step forward if the commission in its entirety had not only a good knowledge of law, but also of economics, of engineering and of finance; and if each of its members were proficient in three, or at least two, of these subjects. In an efficient regulatory body, quality also extends to the staff. It is small but select.

By far the most valuable work of a trained commission and staff would be to reassure the public. Prompt, open and clear decisions by a commission of eminent attainments would soon dispel all public doubt and suspicion. Another and hardly less important result would be that such a commission automatically would find itself in harmony with the law of the land on valuation. The dangerous discontent with many of the court decisions would cease when people discovered that there was no conflict between court and commission.

As might be expected, the Supreme Court, ever eminent in ability and experience, has developed and stated the clearest principles of valuation. These are in best accord with the views of experienced engineers and students of the subject. Of late we sometimes hear it suggested that the problem is economic rather than legal, and that therefore it is more reasonable to expect its proper solution by the commissions than by the courts. It is true that the commissions should conclude the matter and not leave it to the courts. But to accomplish this it will be necessary for some of the commissions to conform to sounder principles of valuation.

Combination Traffic and Warning Signal Used at Salt Lake City



Vehicular traffic is warned of the approach of an electric car by flashing lights in this signal installation at Salt Lake City

VEHICULAR traffic control and warning of the approach of electric interurban cars are dual functions of a novel signal installation made at Salt Lake City, Utah. The double track of the Bamberger Electric Railroad on Jennings Avenue crosses Second West Street at right angles. Because the latter street is 80 ft. wide between curbs, it was felt that a pipe standard at one side would be too much out of the line of vision. The municipal authorities would not permit the installation of a safety island in the middle of the street on which the flashing red projectors might be mounted on a pipe standard, as is usual in crossing signals. For this reason, four projectors were suspended between two messenger wires stretched across the street, one pair facing each direction. The units of a pair are 30 in. apart and are mounted adjustably on gimbal suspensions, so as to direct the concentrated beam most favorably upon the automobilist. These red projectors are 9⅝ in. in diameter with glass parabolic mirrors and 50-watt concentrated filament lamps. A traffic signal, of the four-way two-deck type with red and green lenses, is suspended above the center of the intersection, showing normally red to the railway and green to the traffic on Second West Street. Starting contactors are located above the track 400 ft. back of the intersection, with stopping contactors just on the far side of the street.

An electric train, approaching the crossing and passing under the starting contactor for that direction, throws the normally red traffic signal in the sight of the motorman to green, which indicates that the signal on Second West Street has been changed from green to red, stopping traffic on that street. At the same time, the red flashing projectors, which were hitherto dark, begin to flash alternately to indicate that a train is approaching the crossing. As soon as the trolley wheel of the electric car passes under the stopping contactor, beyond the crossing, the indications are thrown back to normal.

The lights and flasher relay are fed from a 110-volt alternating-current circuit, while the latch relays are operated from the 750-volt direct-current trolley. Separate relays are provided for each track, with their contacts in series for the red indication to the railway and in multiple for the green indication and the flashing lights. Thus a train quickly passing on one track will not stop the warning for a train approaching slowly on the other track.

Digitized by Google

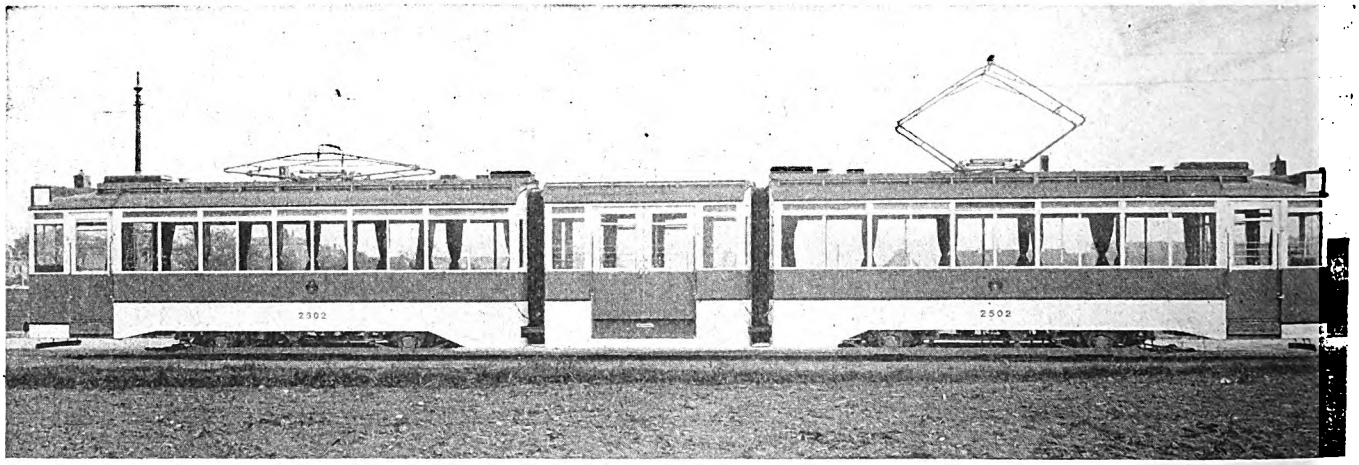
ARTICULATED CARS Teste

Two types of four-axle cars built in three sections, have been developed for street car service in this important German city. The methods used for supporting the bodies on four axles differ widely in the two designs, which were worked out in collaboration with the railway officials

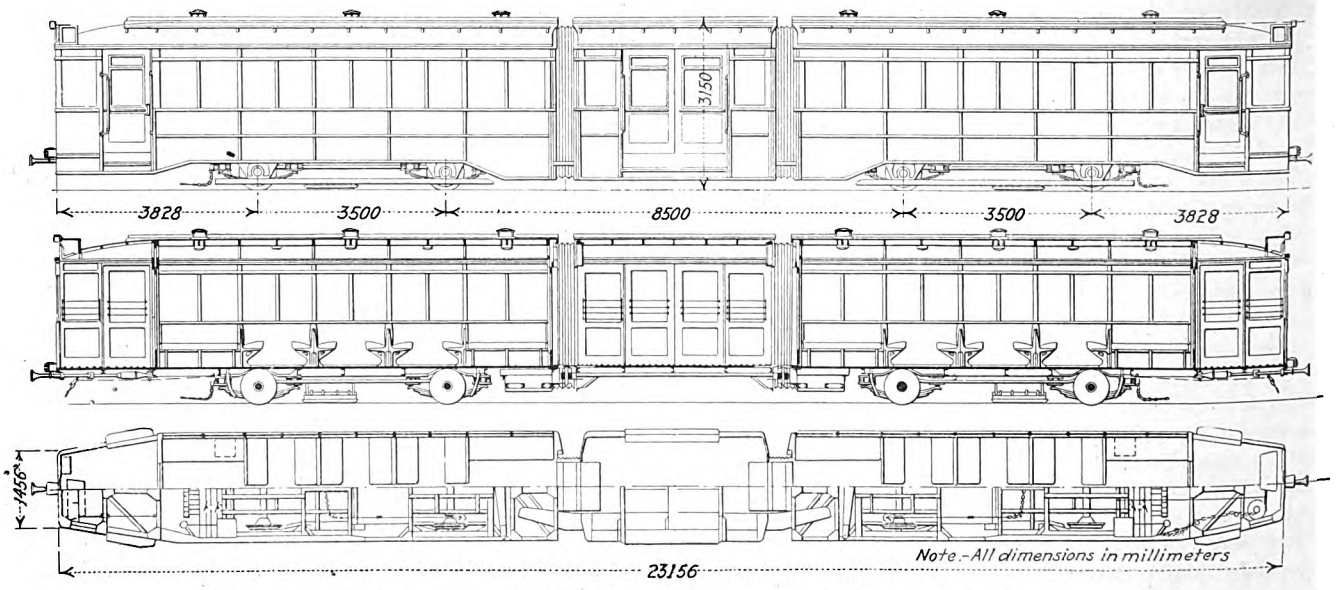
GROWING street trailway traffic in Germany has caused a demand for large-capacity street cars, similar to those used extensively in American cities. This demand has led to the development by the management of the Dresden municipal railway system, in co-operation with two of the leading car builders, of two types of three-unit articulated trains which have a number of novel features.

One of the trains, built by the firm of Christoph & Unmack of Niesky, with electrical equipment by the Sachsenwerk of Niederseidlitz, comprises two single-truck car bodies with a third suspended between them by an articulated coupling. Each of the end sections has a seating capacity of 30 persons and standing room for six more. The central section has room for 30 standees and each end platform for 8 standees. The capacity is 60 seated and 58 standing passengers, a total of 118.

Extensions of the center sills of the middle section rest in articulating bearings in the end sections, which



The articulated car made by the Christoph & Unmack firm has two motor sections supporting a center section



Floor framing of the Christoph & Unmack car, showing method of supporting the center section

Digitized by Google

Dresden

are carried on springs. The horizontal pull is taken on a coupling bolt which is carried in a swiveling bronze bushing. Vertical forces are transmitted through spring-supported roller bearings running on rails in the end section so as to damp out oscillations.

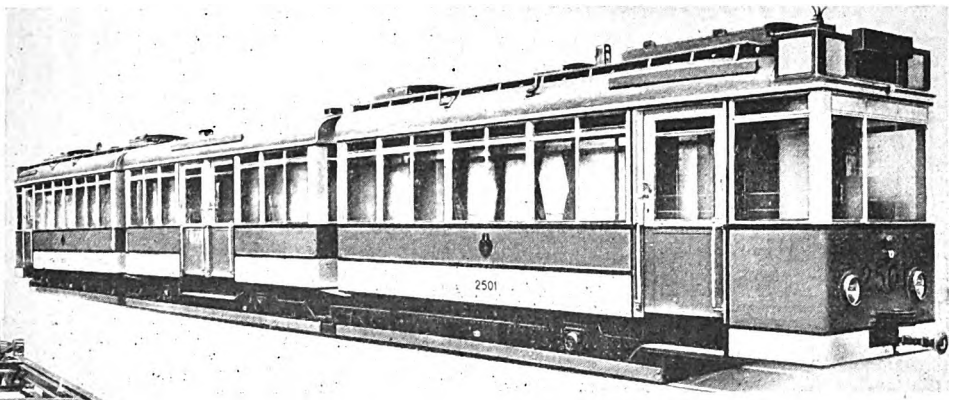
The end units are of the two-axle type without trucks, built, in general, according to standard German practice. Each wheel is supported by a leaf spring, each end of which is carried in a shackle with a spiral spring, making a three-point suspension and said to give very smooth running.

The underframing is built up of steel sections, joined with gusset plates and struts. The side frame is built according to a patented design known as the Niesky hollow-post construction. The posts are made of U-sections with reinforced flanges, while the carlines and connecting members are pressed steel. The sheet steel siding is formed into pockets for receiving the connecting bellows at the abutting ends of the bodies. The arch-type roof is covered with waterproof duck.

The double entrance doors are sliding, running in ball bearing tracks, and are geared to open simultaneously. The passageways between the sections are made of overlapping steel plates, and the bellows inclosing the sides are of leather covered with duck.

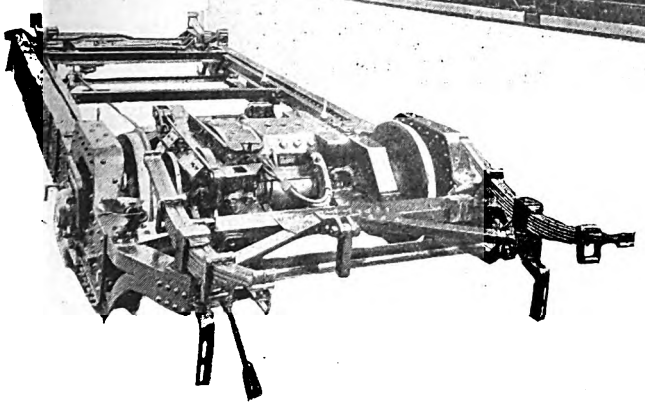
There are three independent braking systems on the car. The service brake is of the dynamic type, in which the car motors are short-circuited through suitable resistance. There is a hand brake of the toggle type acting on all axles. The new feature is a magnetic rail brake of the Jores type. To improve the braking action on slippery rail there is a sander which can be operated by hand from the motorman's position or automatically. The electromagnetic control of the sanders opens the release valve when there is an emergency application of the short-circuit brake or any application of the magnetic rail brake, which is intended for emergency stops only.

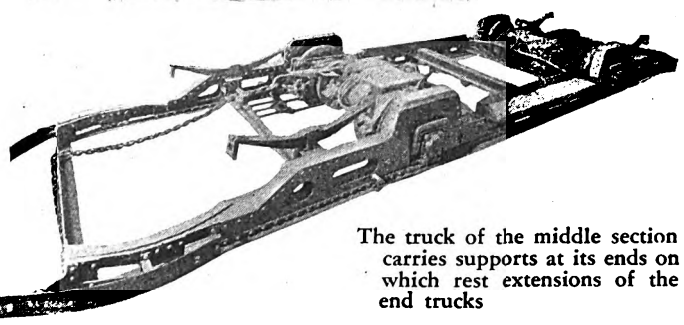
Four propulsion motors are used, one on each axle.



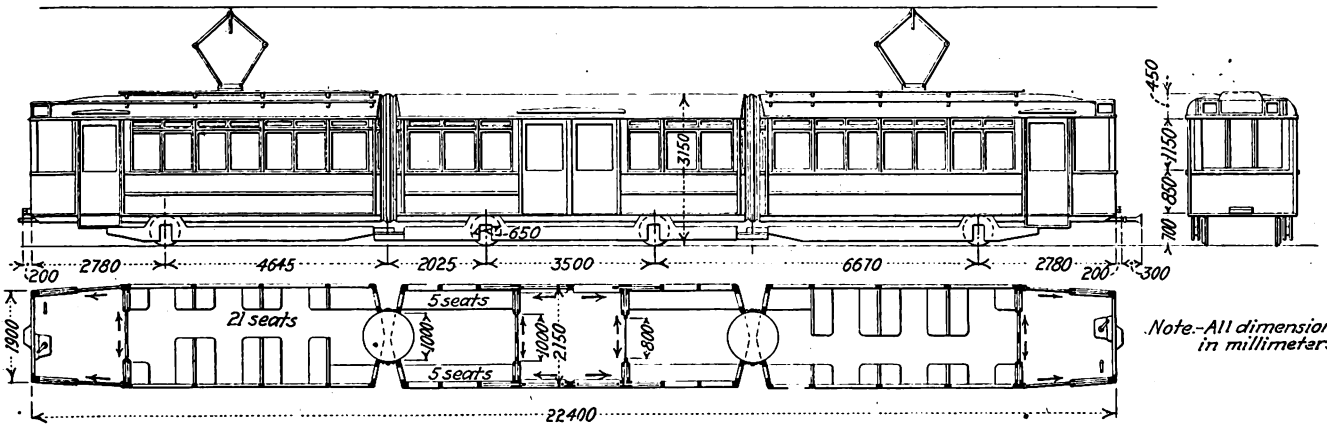
The articulated car furnished by the Waggon & Maschinenbau is of similar appearance to the other, although the construction differs radically

A two-wheeled truck carries each outer section of the Waggon & Maschinenbau car. Its inner end rests on the four-wheeled truck under the middle section





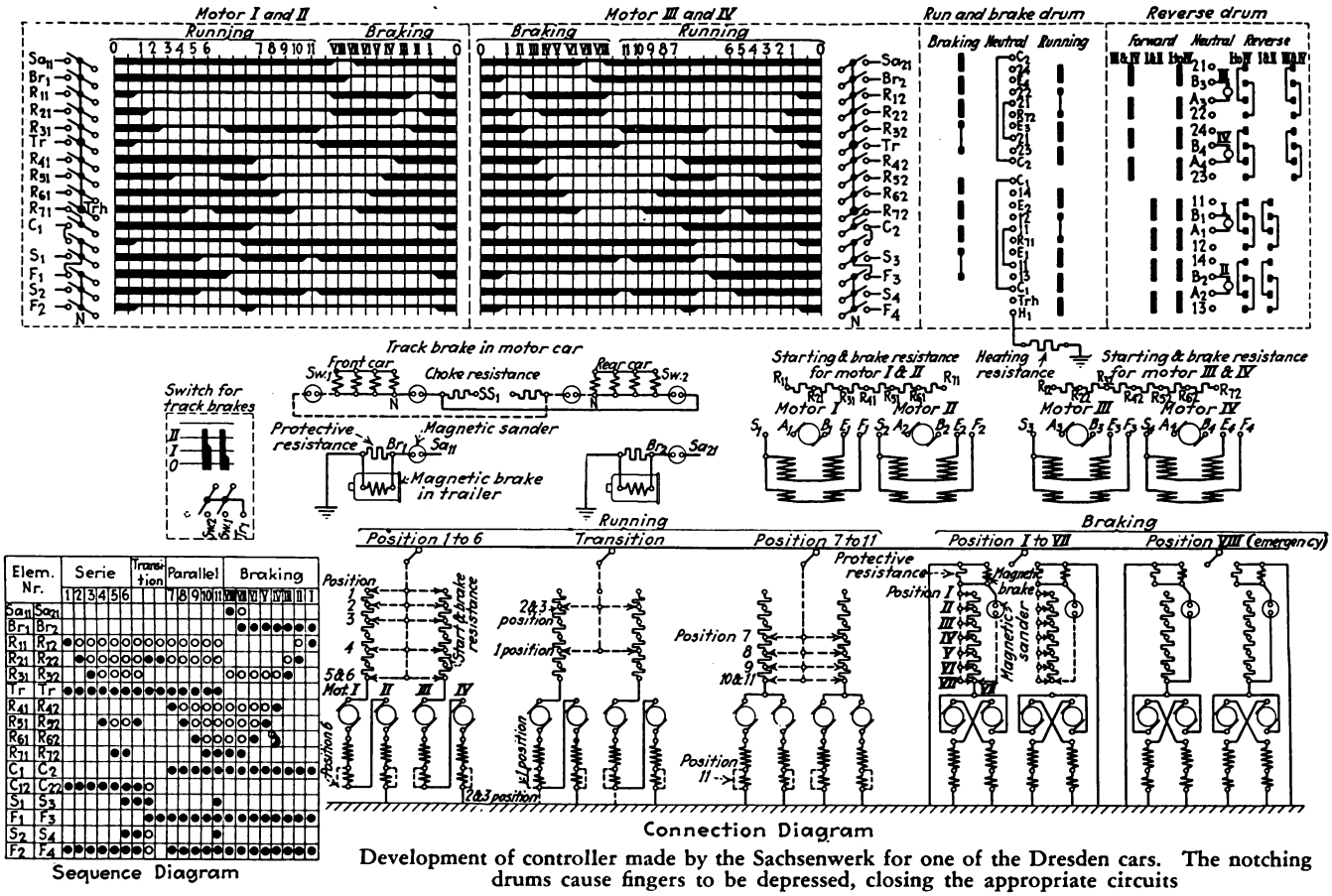
The truck of the middle section carries supports at its ends on which rest extensions of the end trucks



Note.-All dimensions in millimeters

The method of supporting the car from a center truck and the two-wheel trucks of the end sections may be seen in the diagram

Digitized by Google



Development of controller made by the Sachsenwerk for one of the Dresden cars. The notching drums cause fingers to be depressed, closing the appropriate circuits

Each motor has a one-hour rating of 33 kw. at 550 volts d.c. and 800 r.p.m. Although the wheel diameter is only 650 mm. (25½ in.) the over-all height of the motors was kept small enough to give satisfactory road clearance and clearance between the motor and the car floor.

Since the train consists of three separate sections, and is arranged for double-end operation, it was necessary to carry the power and control wires from one end to the other. They are placed in cable ducts in the roof, terminating in connection boards at the ends of the units. Connections are made with extra flexible cable jumpers between the end and center sections.

Platform control for the motors was specified. On account of there being four relatively large motors grouped in two units, and as it was desired to be able to control each of the motor sections by itself, double-drum controllers were installed. The controllers have two interlocked drums rotating together, each drum handling the pair of motors in one section. Separate starting and braking resistances are installed for the two groups of motors. In order to make the controller approximately as easy to operate as a standard series-parallel controller, a notching type drum was adopted, in which the connections are not made directly by the pressure of the fingers on the segments, but in which the movement of the fingers opens or closes contacts pivoted to them. The one controller can handle either the two motor car sections together or one alone.

The dynamic brake for normal service is controlled by the same controller as the power. The brake circuits for the two pairs of motors are also independent, so that if one motor fails, half of the dynamic braking effort is obtained. Each magnet exerts a pull of 4,500 kg. (9,921 lb.).

Emergency braking is done with four rail shoes, with electromagnets of the Jores type. These brakes are attracted to the rails and are fed with line current. The brake controller is alongside the main controller, although not interlocked with it. The switches are so arranged that the magnets on the rear section are set first, obviating surges from having the rear section of the car strike the forward ones. When the track brakes are operating, a bell fed with line current continues ringing, so as to warn the operator not to keep the brake on longer than necessary.

Other equipment of the car is standard. The starting and braking resistors are mounted on the roof, and current is supplied through Fischer-type pantographs.

Construction of the other articulated car differs considerably from that described. It was built by the Waggon & Maschinenbau A. G. of Görlitz, and the elec-

Principal Dimensions of the Two Dresden Articulated Cars

	Christoph & Unmack			Waggon & Maschinenbau		
	mm.	ft.	in.	mm.	ft.	in.
Length over dashers	23,156	75	11⅛	22,400	73	5⅛
Length over couplers	24,166	79	3⅛	22,800	74	9⅛
Length of end compartment	7,300	21	11⅛	5,465	17	11⅛
Length of middle compartment	4,000	13	1⅛	7,390	24	2 1⅛
Length of end platforms	1,928	6	3⅛	1,880	5	11
Maximum width	2,200	7	2⅛	2,200	7	2⅛
Width over side sheathing	2,116	6	11⅛	2,150	6	10⅛
Height, rail to car roof	3,150	10	4	3,150	10	4
Height, rail to car floor	700	2	3 1/16	700	2	3 1/16
Height of first step	395	..	15⅛	380	..	14 1/16
Height of second step	305	..	11 1/16	320	..	12⅛
Track gage	1,448	4	9	1,448	4	9
Diameter of driving wheels	650		25⅛	650	..	25⅛
Rigid wheel base	3,500	11	5⅛	3,500	11	5⅛
Distance, coupling center to center of wheelbase	4,000	13	1⅛	4,645	15	2⅛
Distance between coupling centers	4,000	13	1⅛	7,550	24	5⅛
Weight of train complete, kg. or lb.	28,000		61,730	28,000		61,730
Number of seats	60			62		
Number of standing places	58			55		
Total passenger capacity	118			117		

Digitized by Google

trical equipment was furnished by the Siemens-Schuckert Werke of Berlin. In this car the center section is mounted on a four-axle truck, and the end sections are mounted on two-axle trucks, the inner ends of which rest on extensions of the middle truck, being joined with articulating couplings. The three sections are of approximately equal length, with double sliding doors in the center section. Each end section has seats for 21 passengers and standing room for three in the body, as well as eleven standing places on the end platform. The middle section has seats for twenty and standing room for 27, making altogether 62 seats and standing room for 55, or a total of 117 passengers.

The electrical equipment of this car consists of four motors of 38 kw. one-hour rating at 850 r.p.m. The control is similar to that of the other car, including dynamic braking for service and a magnetic rail brake for emergencies.

Principal dimensions of the two cars are given in the accompanying table.

Selection of Motor Controls

Depends on Circumstances

By R. S. BEERS
Transportation Engineering Department
General Electric Company, Erie, Pa.

WHEN selecting a type of control, an intimate knowledge of the work to be done, the scope of the control and the limitations of the operator, physical and otherwise, are essential. For instance, on a bus that must be steered, a control that is actuated by hand is not as desirable as one that is actuated by the foot. On the other hand, if there are few stops and little traffic, a hand control is simple and may be very successful.

One of the first considerations of controls is whether it be automatic or non-automatic. With the former the operator's work is reduced to the minimum, and the most of the control functions are predetermined, fixed and unchangeable; with non-automatic control success depends largely on skillful and intelligent manipulation.

Non-automatic control should preferably be used where the train weights vary through a wide range, such as with an electric locomotive which must run by itself as a unit and also when coupled to a heavy train. Automatic control is preferable where a number of similar units make up a train, as for motor equipments on subway, elevated and suburban electric trains.

With single cars in city streets, both types of control are successful. The majority are the simple non-automatic K type drum control. Trolley bus controls abroad are generally non-automatic, while in this country both automatic and non-automatic are in successful use. The selection of automatic control for trolley buses was made largely to relieve the operator of as much mental and physical labor as possible. Incident to this, on trolley buses, the foot is preferable to the hand for operation of the controller. This, in turn, leads to the automatic type which requires only pressing a lever to obtain smooth acceleration. The non-automatic type requires a pause on each controller notch, which is not as easily done with the foot as with the hand because the feet are not trained for such nicety of action.

Success of automatic controls depends on a governing influence, the one commonly used being a combination of motor current and time. A system control governed by current alone, if arranged for a level road, would probably make the acceleration too slow on a hill; or, if arranged for the hill, it would be too fast and jerky on the level. Likewise, if time alone is used, there is no limit to the abuse that the motors may receive. Fortunately, a combination of the two is a successful arrangement. Modern transportation vehicles, with accelerating rates as high as passenger comfort will permit, require a control that normally accelerates on time but is prevented from exceeding a safe motor current value. So long as the acceleration rate can not be tampered with by the operator, one is sure of always starting the vehicle at a high rate, which in frequent stop service is one of the essentials necessary to maintain a high schedule speed. Today we talk high accelerating rates, 3 m.p.h.p.s. being the value most frequently used, while formerly it was 1.5 m.p.h.p.s. Actually, our motormen on city cars with K controllers have been increasing the accelerating rates to maintain their running time. A survey covering the United States brought out that the average time for turning a K controller "full on" was seven seconds, but, in a number of cities, it is done in four and five seconds. Translated into average accelerating rates, this gives values of 2 to 2.5 m.p.h.p.s. When the average accelerating rate exceeds 2.5 m.p.h.p.s., it is necessary to have more notches than are included in the usual K controller in order to obtain smooth and comfortable acceleration. It is obvious that the more notches used, the smaller the current changes will be when each section of resistance is cut out. This has a twofold value, as it insures comfortable acceleration and, at the same time, reduces the likelihood of wheel slippage.

The best control for fast acceleration is automatic in action. So long as the acceleration rate is high and constant, this insures the quickest getaway. Where the acceleration rate is selected by the operator, there is no valid reason why a simpler, non-automatic control with sufficient controller notches should not be used.

The modern fast acceleration control is compact and easily installed under the car or in a cabinet inside the car or bus. Controls of this type are in successful use on either cars or buses in large cities like Chicago, Baltimore, and Brooklyn, as well as others such as Albany, New Orleans, Salt Lake City, Youngstown and Knoxville.

Digitized by Google

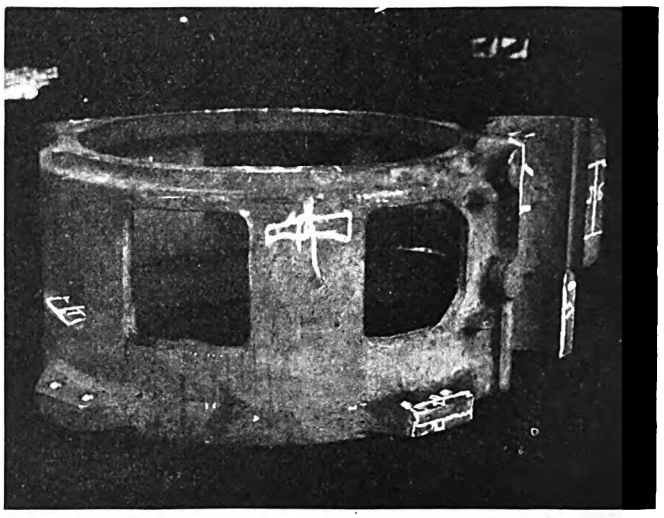
Aluminum Frame

Reduces Railway Motor Weight

MORE than a year ago the Westinghouse Electric & Manufacturing Company inaugurated plans for reducing the weights of heavy electric railway motors, particularly single-phase motors. It was realized that, where possible, use of light-weight materials would make a considerable saving in weight if substituted for steel or iron. As a result of conferences with the engineers of the Aluminum Company of America, it was estimated that savings of 600 to 1,000 lb. would be possible on a 200-hp. single-phase motor of the type commonly used on the Pennsylvania Railroad; New York, New Haven & Hartford; New York, Westchester & Boston; the Reading Railroad, and similar installations. This was found possible because the motor shell in single-phase machines is not a part of the magnetic circuit. Beside the frame, it was found possible to make end housings and axle caps of aluminum. Similar parts have been in use on an experimental car of the Cleveland Railway for some three years.

In order to make a satisfactory motor shell, it was necessary to develop an aluminum alloy casting which in strength would compare favorably with the cast-steel frame now generally in use. The first frame was cast in aluminum alloy from a pattern made for cast steel. The motor case of aluminum alloy weighed 553 lb. as compared to 1,295 lb. for the steel casting from the same pattern. It was, however, necessary to test the aluminum frame under conditions approximating those of actual service. Accordingly, the Aluminum Company set up the castings on an improvised car axle, with the motor nose centered as in service and dropped weights from various heights on to the middle of the shell. The steel frame was tested first with a 1,000 lb. weight dropped 2 ft., 3 ft., 4 ft., 5 ft., 6 ft. and 7 ft., with no resulting indications of failure. The first aluminum frame failed when the 1,000-lb. weight was dropped 4 ft., by breaking out of the nose from the main frame. With the information thus determined at hand, the frame was redesigned, certain parts being increased in cross-section and others diminished. The new frame which was cast withstood the 1,000-lb. weight dropped from heights up to 7 ft.

Not satisfied with this performance, the test was continued, a 2,000-lb. weight being dropped on the steel frame up to a height of 7 ft. at intervals of 1 ft., with no disturbance of the steel structure being evident. The second aluminum casting was then subjected to the 2,000-lb. weight and could not be fractured by it when dropped up to the 7-ft. height. It was not considered necessary to carry the test further, as the stresses existing in the frame when the 2,000-lb. weight was dropped 7 ft. were greater than could possibly be encountered in service. Furthermore, it was considered that other parts of the motor, its mounting, the parts of the truck to which the stresses must necessarily be diverted, were considerably weaker than the frame. The Westinghouse engineers considered the aluminum frame to be entirely suitable for railway service. Plans are now under way for the introduction of test equipment of the aluminum-equipped single-phase railway motors, to obtain actual service runs.



Frame for single-phase railway motor of cast aluminum alloy, which weighs only 40 per cent as much as the steel casting it replaces

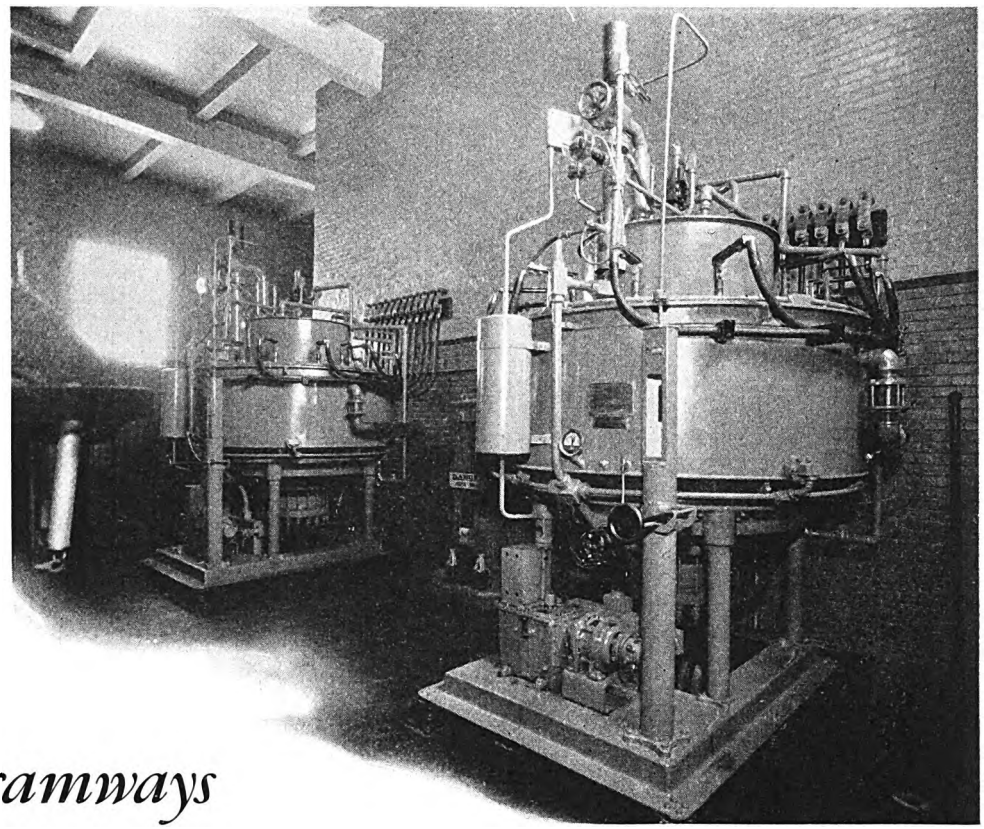
By the redesign of the castings, in connection with the new alloy used for its manufacture, the weight was reduced to 533 lb. as compared with the steel castings of 1,295 lb., or a net saving per frame of 762 lb. This reduction in weight should prove a material factor in the design of future single-phase motors. It is understood that the Westinghouse Company is prepared to offer these motors with aluminum frames, end housings, axle caps, spiders, and similar castings. Direct-current motors, in which the frame is part of the magnetic circuit, are being built with aluminum end housings, axle caps and similar parts. Since the substitution means a considerable reduction in unsprung weight, it is believed the change should be attractive.

P.L.M. Gets Heavy Locomotives

NEW electric locomotives placed in service on the French Paris-Lyons-Mediterranean railway a few months ago and operating between Chambery and St.-Jean-de-Maurienne, near the Italian border, have demonstrated a remarkable hauling capacity, according to a report to the Department of Commerce by Trade Commissioner Louis Hall, at Paris.

Over comparatively heavy grades these locomotives can haul trains of 600 tons at a speed of approximately 55 m.p.h., while along other parts of the line trains of more than 800 tons have attained speeds of from 60 to 66 m.p.h. These electric locomotives are said to be twice as powerful as the most powerful steam locomotives of the "Mountain" type operated over the P.L.M.

Digitized by Google



In the Viau substation the two 12-phase, 1,500-kw. rectifiers convert power from 60-cycle alternating current to 600-volt direct current

Montreal Tramways Installs Third

Automatic Rectifier Substation

Following the successful use of mercury arc rectifiers with full automatic control for more than three years, the Montreal system continues the expansion of its power supply with similar equipment, but with many distinctive features

By

M. L. de ANGELIS
Assistant Electrical Engineer
Montreal Tramways, Montreal, Canada

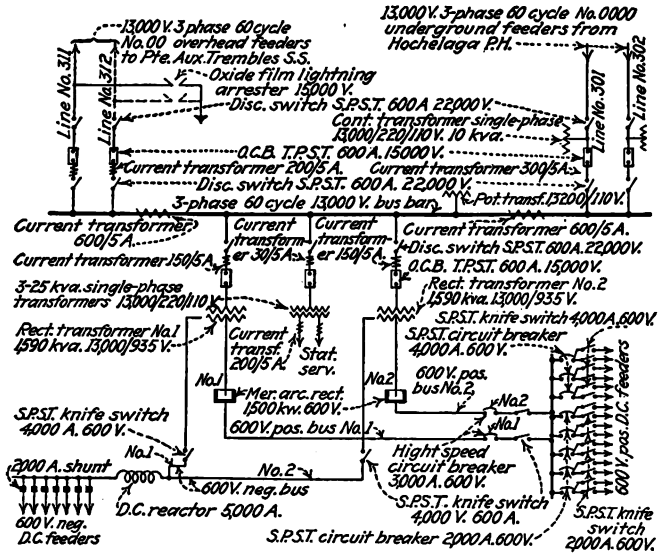
SINCE the first installation of mercury arc rectifiers was made by the Montreal Tramways in the Verdun substation in February, 1927, the results have been followed with great interest by the management. This installation, which formed the subject of an article in ELECTRIC RAILWAY JOURNAL for April 30, 1927, was followed the succeeding January by a second rectifier station at Rockfield (see the JOURNAL for August, 1929). These installations have been so successful from the points of view of reliability maintenance and operating costs that the company decided to extend the use of this type of converting apparatus and to install it in the new Viau substation. This third station began operation on April 10 of this year.

Construction of this station was necessary to take care of increased traffic in the eastern districts and to replace another one the equipment of which had become inadequate and somewhat inefficient. Moreover, due to the change in the load center of the sections fed by the old station, the latter was no longer correctly situated for minimum direct-current distribution losses. It was, therefore, decided to locate the new station further east, where several important converging lines have track loops.

In the main the building is similar to that of the Rockfield Station, the approximate over-all dimensions being 52 ft. 6 in. by 36 ft. 1 in. by 32 ft. high, the volumetric density being 20.2 cu.ft. per kilowatt. It is of brick with a concrete basement carefully waterproofed. The building is entirely fireproof. The roof is of Aerocrete slabs covered with Celotex mastic cement 1 in. thick. The high-tension oil circuit breaker and busbar cells are of concrete and situated along one side of the main room, while the rectifiers are on the other side.

The control switchboard room is on the same level as the rectifier room, without any separating wall between, as shown in the plan. This layout has given the advantage of using one side of the control room for the

Digitized by Google



One-line schematic diagram showing the circuits of the Viau rectifier substation of the Montreal Tramways

high-tension cells, reducing to a minimum the total length of the building. The bake-out transformer is between the two rectifier tanks on a small foundation against the longitudinal wall. All the high-tension compartments are provided with removable asbestos doors.

The rectifiers rest on the floor without any special foundation, and the floor of the transformer compartments is laid directly on the ground.

No lifting device has been installed above the rectifiers for maintenance purposes, because the heaviest part requiring inspection is the anode, which, with its clamping plate, can be lifted by two men without difficulty.

The basement contains a main room, a d.c. switchboard room, two small rooms for the incoming and outgoing high-tension feeders, a furnace room and a toilet. In the main room are the two fan-and-water-cooler sets, the three circulating water pumps, the water storage tank, the negative series reactor, the bake-out resistor, the control batteries, the transformer bank for station service and the negative feeder cable potheads and shunts. In the d.c. switchboard room are the rectifier and positive feeder panels, the high-speed circuit breakers, the shunt filters for attenuation of telephone interference and, in general, all the main d.c. conductors.

The transformer cells are at the side of the building nearest the rectifiers and are separated from the interior by a fireproof wall. They are roofed over but have a large front opening with Kinnear rolling steel doors and heavy wire screens. These doors permit easy removal of the transformers and provide air for cooling them. Louvers in the outside wall above the doors evacuate the hot air. In the roof of each cell a hook has been installed just above the transformer for lifting the core and windings by means of a chain block.

Ventilation of the basement and main floor rooms is obtained by means of two openings in the basement walls, equipped with horizontal shutters and screens. The hot air is discharged through two Robertson ventilators in the roof. The outlets of the fans for the water coolers converge to a vertical flue built into the wall between the two transformer cells. Solenoid-operated gates prevent the exhaust air backing into either of the two fans which may not be operating.

The electrical equipment, which was supplied by the Canadian General Electric Company. includes:

Two 1,500-kw., 12-phase, 600-volt steel tank mercury arc rectifiers with alternating-current ignition capable of carrying 150 per cent full rated load for two hours.

Two 13,000/935-volt, 60-cycle, delta/quadruple zigzag 3/12-phase transformers for the rectifiers and capable of the same overload as the latter.

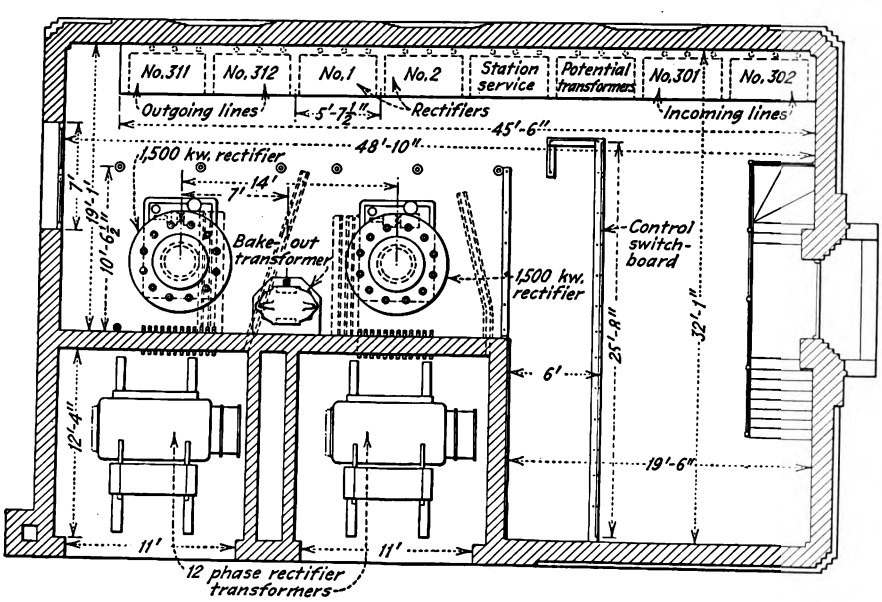
One 5,000-amp. series reactor rated to withstand 150 per cent load for two hours.

One bake-out transformer and resistors.

Two self-cooling systems for the circulating water required for cooling the rectifiers.

One complete automatic switching equipment for the operation of the following circuits:

Two incoming high-tension lines.
Two outgoing high-tension lines.
Two 1,500-kw. mercury arc rectifier units.
One station service transformer bank.
Three 4,000-amp. d.c. automatic reclosing feeders.
Five 2,000-amp d.c. automatic reclosing feeders.
One synchronous selector supervisory control equipment, and necessary storage batteries.



As in the previous rectifier substations in Montreal, the main apparatus and switchboard are on one floor, with the transformers in separate compartments

The outstanding novel features of the main apparatus are:

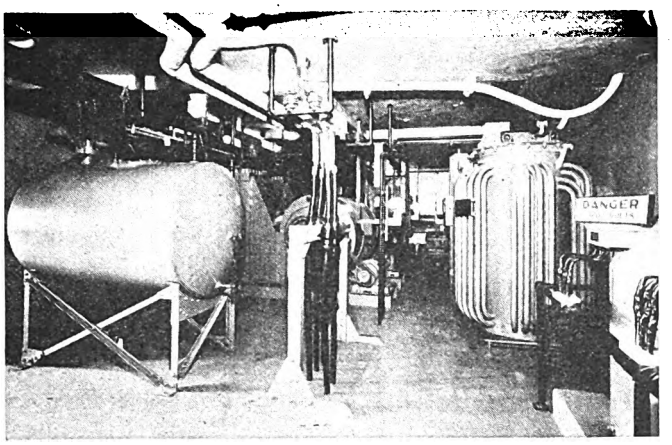
The mercury arc rectifiers, while generally similar to those in the earlier stations, have a number of different features. The tank proper with its associated devices is mounted on an insulated metal base with vacuum pumps, gages, water valves and other devices. The anodes are of graphite and are insulated from the tank by a special "micalex" insulator, which acts also as a vacuum seal. It has high mechanical strength, and its expansion coefficient is similar to that of the steel rod forming the terminal to the anode.

Anti-backfiring devices are mounted in the anode shields. Automatically controlled anode and tank heaters keep the rectifier at proper temperature under all weather conditions.

Each unit has its own water-cooling system, consisting of a blower,

Digitized by Google

radiator and pump for circulating the water. A water storage tank common to the two rectifiers supplies the make-up water should the city water fail for a long period. A third or spare pump is so arranged with valves that it may be used to replace either of the other two pumps. The fans operate only when the water has reached a temperature necessitating forced ventilation.



Auxiliary equipment, including water tanks and blowers and house transformers, are mounted compactly in the basement

The Langmuir mercury condensation pump is of the two-stage type, allowing the very low pressure to be obtained quickly in the rectifier tank. The cooling water for this pump is taken from the self-cooling system of the rectifier.

The approximate weight of the rectifier, together with accessories, is 8,000 lb.

Transformers for the rectifiers are of the outdoor, self-cooled type, with oil conservator. The three primary terminals are brought through horizontal bushings mounted on the vertical wall of the tank and located in an oil-filled junction box fixed to the tank. This box is provided with an oilproof stuffing box designed to receive the high-tension 3-phase cable feeding the transformer. The primary is connected in delta and the secondary in quadruple zigzag with the interphase transformers mounted in the main transformer tank. The complete transformers weigh 33,300 lb.

A bake-out transformer with adjustable load resistor is supplied for "forming" the rectifier tank after it may have been opened for a prolonged period. This method has proved to be simple and quick.

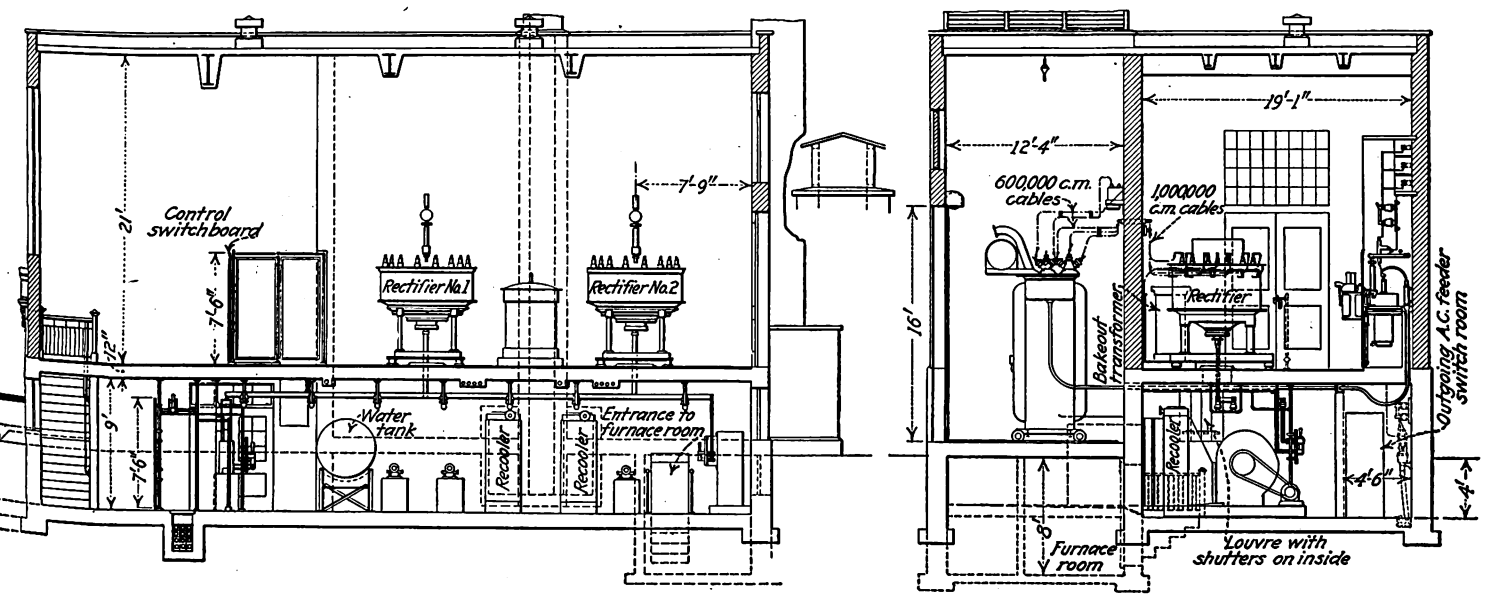
The automatic switching equipment of this station can function: (a) Completely automatically on load responsive impulse; (b) by supervisory control from the load dispatcher's office, or (c) manually from the switchboard in the substation. If operating automatically, the starting indication is given when the d.c. trolley voltage falls below a predetermined value, provided, however, that the high-tension supply has proper phase and voltage conditions. The sequence consists, as in all mercury arc rectifier installations, in establishing the excitation arcs, closing the high-tension breaker to supply a.c. voltage to the main anode and connecting the rectifier to the d.c. bus through a polarized high-speed breaker.

The second unit is started when the load on the first has reached a predetermined value for a definite time. Should the leading unit fail to start within a certain delay, the trailing unit is set in operation and replaces entirely the leading one. The trailing unit shuts down when the load on the station decreases sufficiently to be carried by one unit only, and the leading rectifier is stopped when the load has fallen below a suitable value, provided, however, that the d.c. bus voltage be above a certain amount.

The eight d.c. feeder breakers are self-reclosing and open on a given steady overload or on short circuit. They reclose on stub or multiple feed within a definite time if the load is not excessive.

The usual protective features for satisfactory rectifier operation are included in the automatic control. A throw-over switch has been included to cut out the automatic starting devices and, at the same time, to establish the excitation arcs. A pull-button switch allows the closing and opening of the high-tension rectifier breaker, and another similar switch controls the d.c. breaker. The a.c. over-current protection is retained under manual operation, and the vacuum regulation can also be operated manually, but the tank and anode heaters are always controlled automatically.

When the throw-over switch mentioned above is set for manual operation, the load dispatcher control is entirely cut out of service so as to eliminate all possibility of faulty and dangerous switching from the part of the dispatcher. He, nevertheless, receives proper indication



By the plan adopted this 3,000-kw. rectifier substation is held to small over-all dimensions without sacrifice of accessibility

Digitized by Google

the substation apparatus will be under the control of the load dispatcher located at Cote Street substation in the center of the downtown district of Montreal and adjacent to the company's head office.

The equipment is of the synchronous selector type and allows the dispatcher to perform the following operations at Viau substation:

1. Open and close—Two high-tension incoming line oil circuit breakers, two high-tension outgoing line oil circuit breakers, and one high-tension oil circuit breaker feeding the station service transformer bank.
2. Start, stop and release to automatic operation, the two mercury arc rectifier units.
3. Open and release to automatic operation, the eight d.c. feeder breakers.

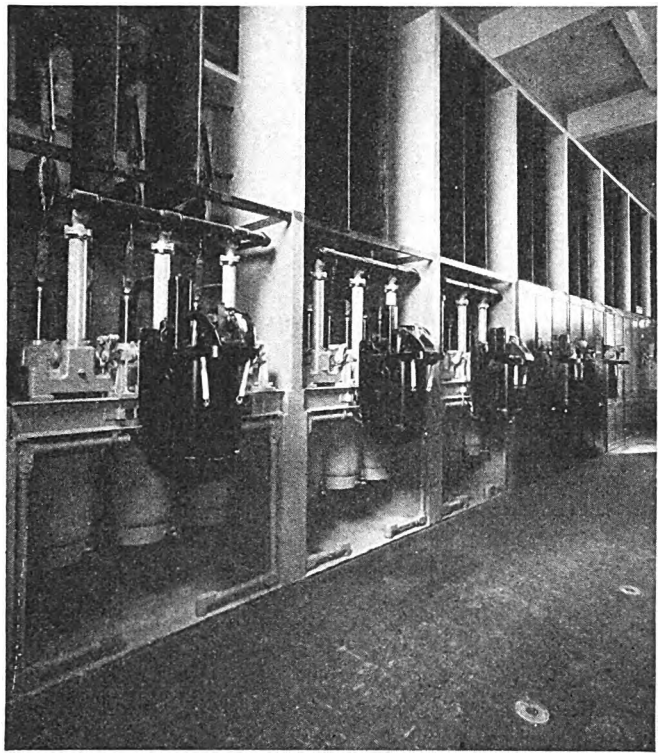
At the dispatcher's office several indications will be obtained, namely:

1. Indication for the open and closed position of two high-tension incoming line oil circuit breakers, two high-tension outgoing line oil circuit breakers, one high-tension oil circuit breaker feeding the station service transformer, and eight direct-current feeder breakers.
2. Indication for the running, stopped and automatic position of the control equipment for the two mercury arc rectifier units.

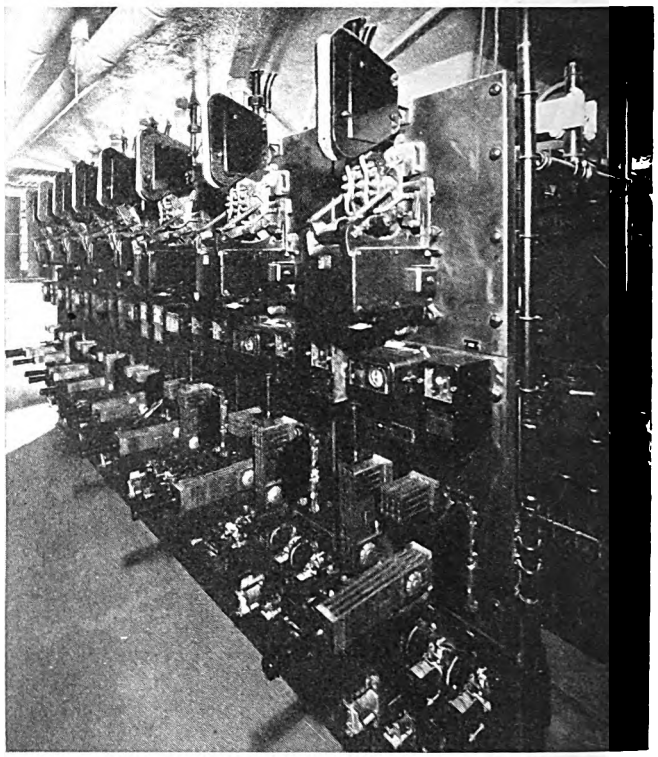
The equipment at the load dispatcher's office consists of the control keys, indicating lamps, polarized relays and synchronous selectors for sending the control impulses and indicating the positions of the various supervised units.

The equipment at Viau substation consists of the supervisory devices, which transmit the control impulses from the dispatcher to the auxiliary control relays and send back indication impulses to the dispatcher. The panels are wired for 22 controls and indications, although only seventeen are actually used at present. Each supervised unit has, at the dispatcher's office, a key and lamp combination comprising a two-position control key, a red and green indicating lamp and a white lamp which signals an automatic operation of the corresponding supervised unit. Each combination has a two-position push-and-pull selecting key to stop the selectors at a point corresponding to the unit it is desired to control and an associated amber lamp to indicate when the selectors are connected to that particular unit. An alarm bell warns the dispatcher whenever the equipment has operated for any cause whatsoever. Exide storage batteries of 120 volts are installed, one at the substation and one at the dispatcher's station. They are of small ampere-hour capacity and obtain a trickle charge from Tungar rectifiers.

This supervisory system requires only four line wires between stations, but to provide for future developments telemetering, telephone and wire break-downs, a six-pair rubber insulated, lead-covering cable has been installed in the same underground duct line as the high-tension feeders.



High-tension breakers are mounted in individual cells with fireproof partitions



A close view of the direct-current feeder board in the Viau substation

It may be mentioned that a polarized high-speed circuit breaker has been installed between each rectifier and the positive bus and set to open in the reverse current direction. This breaker, by opening the circuit in less than 0.01 second, positively prevents damage to the anodes in the occurrence of a back fire, no matter of what material the anodes are built.

One unit was started on April 10 and the other on April 29 of this year. Since then the operation has been satisfactory and without any back fire. The station has delivered 1,131,500 kw.-hr. and been continuously in service, the two units having been in operation during 1,572 hours out of a total of 1,968 hours of elapsed time. One rectifier (unit No. 2) has been available for service throughout this period, while the other was, soon after it had been started, out of service for a few days, due to development of a leak in one of the high vacuum pipes which had been damaged during erection. However, this was easily and quickly repaired and the unit has been available ever since.

Digitized by Google

Cleveland Railway Has Contributory Pension Plan

Costs are shared by the company and its employees, and the risk is carried by two long-established insurance companies. Other pension plans summarized

CONTRARY to the customary practice of electric railway companies in providing old age pensions, the Cleveland arrangement is on a contributory basis and the risk is carried by two long-established life insurance companies. The company aids liberally in the support of the plan, and acts as intermediary in the collection of the monthly dues. This plan has been in effect since July, 1927. Prior to the adoption of the plan a complete analysis of accrued and impending liabilities was made by competent actuarial authorities.

Membership in the plan is voluntary, contingent upon at least six months of continuous service with the company, but approximately 95 per cent of the company's employees have availed themselves of its privileges. In applying for membership the employee simply fills out an application consenting to be bound by the regulations of the plan, and authorizes monthly deductions from his salary. The employees are divided into five classifications, based upon the rate of pay received annually, and dues are fixed in accordance with the following schedule:

Class	Annual Basic Rate of Salary or Pay	Amount of Monthly Dues
A	$1,500 or less	$1.50
B	1,501 to 2,100	2.50
C	2,101 to 2,700	3.50
D	2,701 to 4,500	4.50
E	4,501 and over	6.00

As the plan represents a co-operative effort between the members and the Cleveland Railway, provision has been made for joint representation on the committees which handle the details of administration. There is, first of all, a general committee of 34 members, representing the six major departments of the company. Each department is subdivided according to operating units or classes of employment, and each such unit annually chooses a member to represent it on the general committee. To be eligible for election as general committeeman an employee must have been continuously in the company's service for at least one year. Each of the departmental branches of the general committee selects a chairman, who serves as a representative of that department on the advisory committee. The advisory committee consists of these six chairmen, supplemented by six members appointed by the president of the company, the appointed members including the vice-president and general manager, the superintendent of personnel, the auditor, and the chief surgeon. From the membership of the advisory committee there is elected a chairman and a secretary of the committee. The advisory committee supervises the general work of the plan and determines questions of policy relating thereto.

Membership in the plan carries with it life insurance benefits under a group insurance policy, issued by the Travelers Insurance Company, the amount of which is based upon the member's period of continuous service. Beginning at $750 for those with service records of from six months to one year, the amount increases to $1,000 after the first year, after which it is increased $100 per year until the maximum of $2,000 is attained after eleven years of service. Membership also carries with it a supplemental $500 insurance policy which had been carried by the company at its own expense for several years before the present plan was adopted. Upon leaving the employ of the company the members are entitled to continue their policies in force with the Travelers Insurance Company without medical examination, at rates applicable to the member's then attained age and class of risk.

Should death occur through accidental cause, additional amounts of insurance are paid in accordance with a group policy carried with the Metropolitan Life Insurance Company, the amount for Class A members being $1,500, and for Class B, C, D and E members, $2,000. Under this latter policy, compensation varying from one-half to the entire amount is paid for certain specified injuries, such as loss of sight, loss of limb, etc., the provisions in general corresponding with those in the standard commercial accident insurance policy.

Under another arrangement with the Metropolitan Life Insurance Company, weekly benefits for loss of time due to sickness or accident are paid to the amount of $12.50 for class A members and $20 for classes B, C, D and E. These benefits continue for thirteen weeks and are supplemented in the cases of Classes B. C, D and E by weekly "occupational accident benefits" as provided under the Ohio state compensation law.

Retirement benefits, payable monthly for life, become available to members at age 65, if then in the company's service, after at least 25 years of continuous service. By mutual consent of the railway and the members of the plan, a member may be retired prior to the normal retirement date with a modified monthly benefit. Members who have reached the retirement age if they so desire and the company approves may continue at their regular occupations. Provision has also been made whereby the member at age 60 may receive a smaller retirement benefit, varying with the age of his wife, which benefit will be paid to his wife throughout her lifetime, should she survive him. Satisfactory evidence of good health is required of a member who desires to exercise this option.

Disability retirement benefits shall also become payable to members who may become totally and permanently disabled after at least twenty years of continuous service, regardless of age. These disability retirement benefits begin following the maximum payments of weekly sick and accident benefits and any total and permanent disability benefits which may have been paid under the group life policy.

The amount of the monthly retirement benefits is determined according to the number of years of service in each salary class. Monthly payments to members in

Digitized by Google

the various classes, following 25 years of service are as follows: Class A, $30; class B, $50; class C, $70; class D, $90, and class E, $120. This rate increases slightly with each year of continuous service to the members credit at the period of retirement, reaching a maximum in the case of a member who has 59 years of service. Forty years of service, for instance, provides monthly payments in the various classes as follows: Class A, $48; class B, $80; class C, $112; class D, $144, and class E, $175.

In establishing the salary classification for members with long records of service with the company at the time the plan was set up, the salary under which the member was employed on July 1, 1927, was used as a basis for determining the amount of his retirement and other benefits. If an employee changes from one salary classification to another, the retirement benefit will be the total of the benefit in one class, multiplied by the number of years in that class, plus the benefit of the other class multiplied by the number of years in that class, etc.

Upon leaving the service of the Cleveland Railway members have the privilege of exercising any one of three options with the Metropolitan Life Insurance Company in adjusting their retirement benefits. There is a cash surrender value amounting to from 21 per cent to 69 per cent of the total contributions made to the fund, a paid-up retirement benefit, requiring no further deposits and payable for life beginning at the normal retirement date, or there is the privilege of continuing to buy retirement benefits on the individual's own account at the then prevailing rate for such a service. In the event of death while in the service of the company the member's beneficiary receives the cash surrender value under the retirement benefit in addition to all benefits payable under the group life or accidental death clauses.

All members living in the Greater Cleveland area are entitled under the plan to avail themselves, when sick or injured, of the visiting nurse service provided by the Metropolitan Life Insurance Company. The nurse will, upon call, make at least one visit on every case, and will return as often as necessary upon instructions of the member's physician. Members are urged to communicate immediately with the nursing service with the view of minimizing the effects of any illness or injury.

Other Pension Plans

The pension plan of the Lehigh Valley Transit Company, Allentown, Pa., is conducted much along the lines of certain other companies, the details of whose plans were set forth in the August, 1930, issue of this paper. It has been in effect since July, 1913, and embraces all employees of the company. The pension paid is a flat sum of $20 per month, and is available after from 20 to 25 years of continuous service. No age requirement is specified. The expense of the plan is carried entirely by the company out of current earnings, and no reserve has been set up.

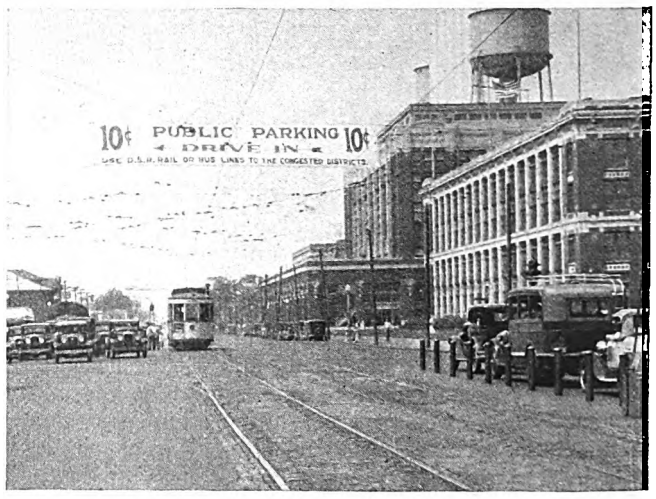
The company has never had an analysis made of its pension liabilities and costs and, with an increasing number of employees going on the pension list, is becoming apprehensive as to the future. The management, according to H. F. Dicke, vice-president, thinks that a pension plan is highly commendable, but is of the opinion that the employees should contribute to its support and that the company should take steps to accrue a necessary reserve.

Since November, 1901, the United Electric Railways of Providence, R. I., has had an old age pension plan in effect on its property. Open to all employees, it is available at age 70, without service requirements. The amount of the pension is based upon the average weekly pay for the last ten years prior to retirement. Payments are made out of current funds without the assistance of contributions from the employees themselves. No reserve has been accumulated. As the result of an analysis of its pension liabilities, the company anticipates difficulties in the future and has under consideration a revision of its present plan in order to reduce its cost, which is at present averaging approximately 1 per cent of the company's total receipts.

Under the proposed plan employees reaching the age of 70 who have served the company for 25 years would receive a pension of $40 per month, with an addition of $1 per month for each year of service over 25 years. In order to take care of special cases it is proposed that the company may, at its discretion, retire with pension any employee who has reached the age of 65 years and who has been with the company twenty years. The pension in such cases would be $35 per month, plus $1 for each year of service over twenty years.

D.S.R. Parking Service Popular

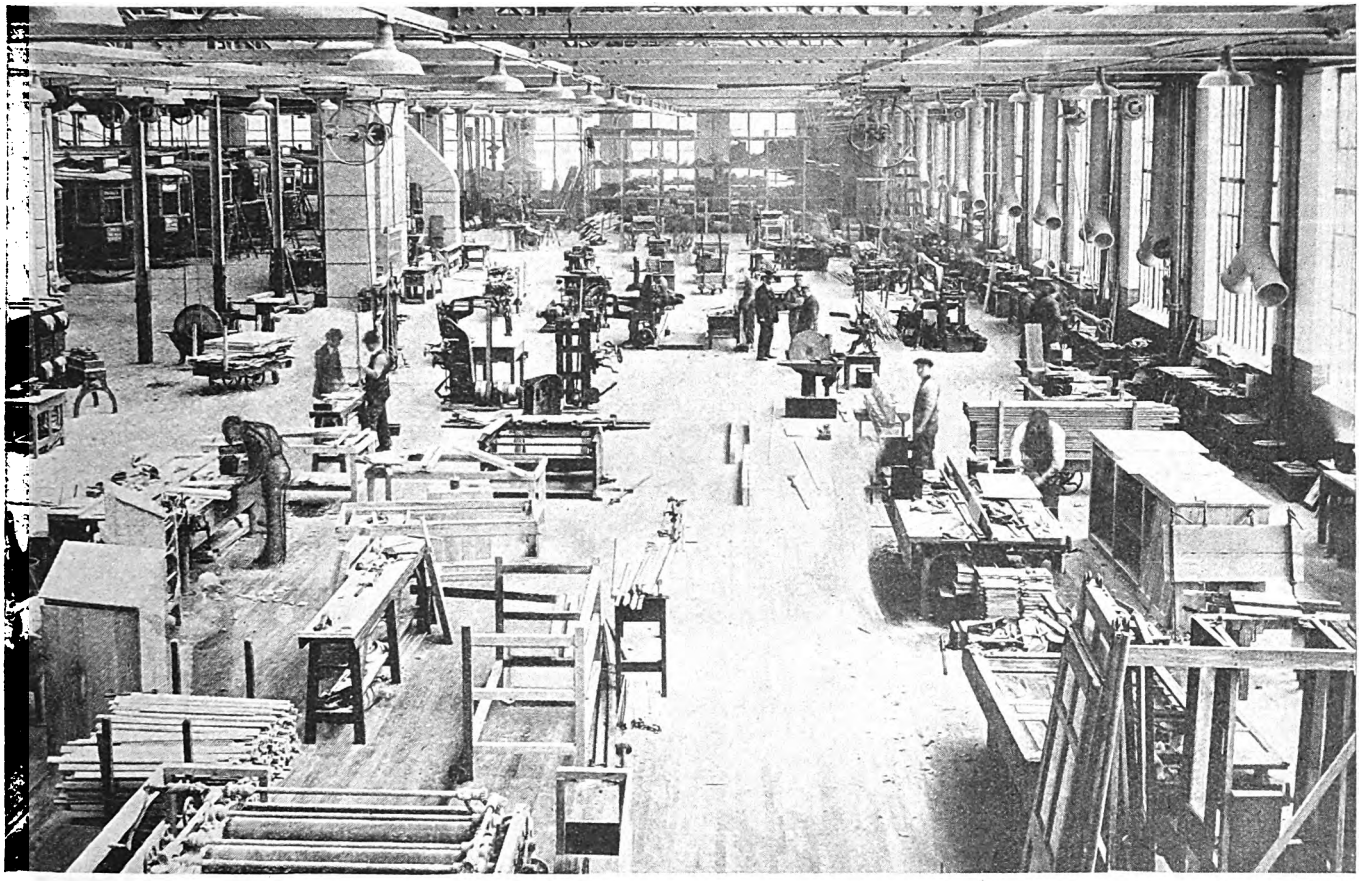
AUTOMOBILE parking service was instituted some time ago by the Department of Street Railways, Detroit, Mich., in conjunction with its street car and bus terminal on Woodward Avenue, 5½ miles from the center of the city. The parking lot is situated about 150 ft. from Woodward Avenue, in the rear of the terminal arcade, which obscures it from the view of the



Banner across Woodward Avenue advertises automobile parking service of the Department of Street Railways, Detroit, Mich.

passing motorists. With the inauguration of this service, the department circulated handbills to persons driving in that vicinity, and the patronage gradually increased to a point where there were approximately 175 cars parked in the lot daily. Recently this patronage has been further stimulated by the erection of a streamer across Woodward Avenue, indicating the location of the lot, and featuring the exceptionally low rate of 10 cents for all-day parking. The first day that the banner was erected there was an increase of 75 cars in the lot, and there is every indication that the full parking capacity of approximately 300 cars will soon be reached.

Digitized by Google



A spacious and well-lighted shop encourages good workmanship

Surrounding Men With

CONVENIENCES

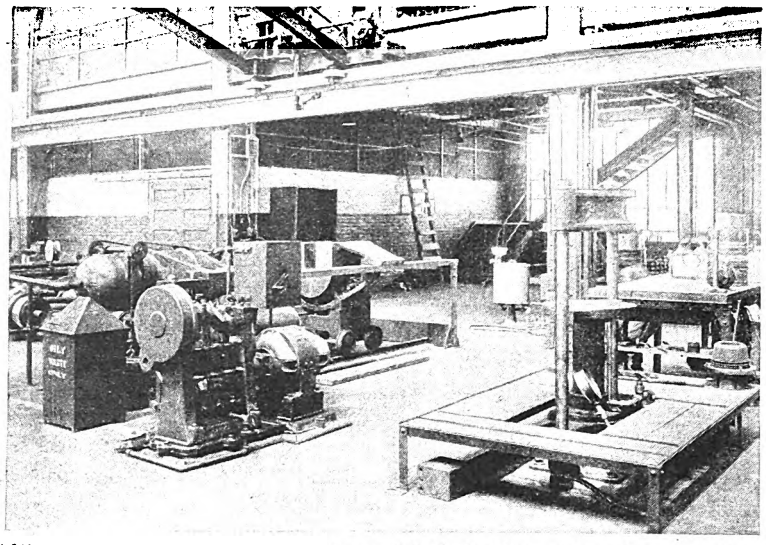
By H. W. McCARTY
Master Mechanic Capital Traction Company
Washington, D. C.

Labor is today the most important element in maintenance work and it is vital that all possible steps be taken to promote its efficiency

OF ALL the items entering into the maintenance of electric railway equipment, no single item represents so large a part of the cost as labor. It is, therefore, highly important and necessary, in order to get the maximum efficiency out of labor, that men be surrounded with those conveniences and comforts that will in a large meausre cause a voluntary response to the demands of modern efficiencey. In some instances, the charge is made that modern day labor is not as efficient, is not as responsive to the ever-increasing demands for economy and high standards of maintenance as it was in the past. This may or may not be true, but the fact remains that the average production or maintenance plant has not kept pace in meeting the rapidly changing conditions, in so far as they apply to the needs of the human element, by surrounding men with those conveniences and comforts that will promote the greatest degree of satisfaction and contentment. An agreeable surrounding elevates the morale, creates an enthusiastic cooperation and has a most definite and direct bearing on the character of the work performed.

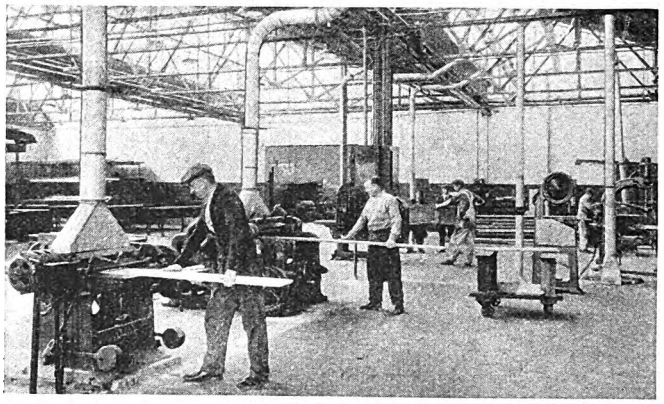
Equipment men are more alive than ever to the fact that higher standards of maintenance and inspection will improve performance, and this not only results in reducing ultimate maintenance, but has the far greater effect of improving public relations by the prevention of equip-

Digitized by Google



Individual motor drive eliminates unsightly belting and makes the shop a better place in which to work

ment failures in service. With this thought in mind, no effort should be spared in seeing that men who are engaged in the important work of maintenance are supplied with the proper tools to do that work, and that they are provided with those comforts and conveniences that will bring a real interest in their work.

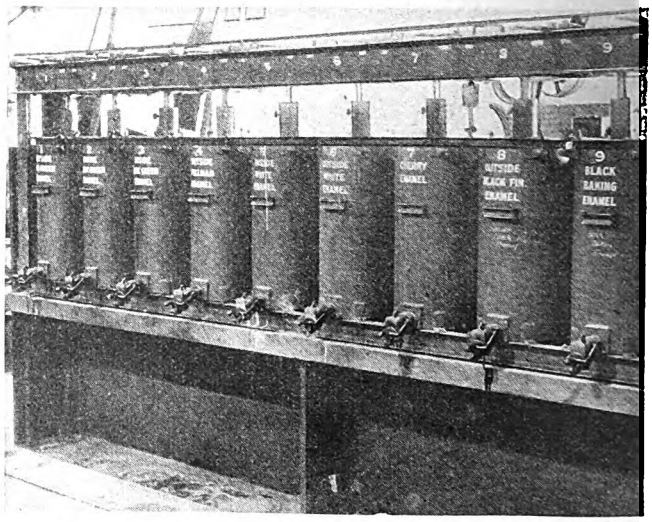


Suction waste removal system promotes cleanliness and protects health of employees

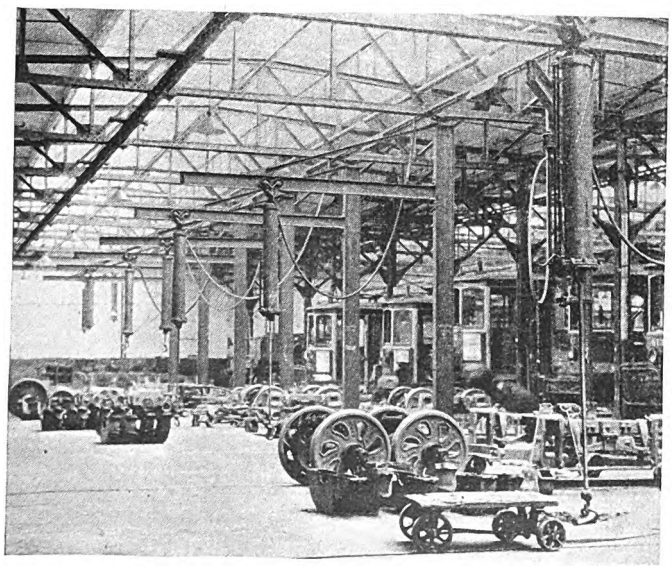
Shop methods, processes and tools used in the upkeep and maintenance of equipment become obsolete in time. There is a wide field for study in regard to the improvement of the machinery used in many of the shop plants. We cannot hope to modernize the human element without modernizing the mechanical element as well. Therefore, we should not expect the same high standard of workmanship from the man who is not given modern tools with which to do his work as we do from the man who is supplied with such tools and appliances. By the same token, we cannot expect to maintain the same high morale in an organization of men who are not surrounded with modern conveniences in the form of ideal shop layouts, as in those organizations which have provided for the welfare and comfort of the employee. Much is said and written about the modernization of equipment and operation, but too little stress seems to have been laid upon the need for the modernization of the conditions affecting the human element, which, after all, is largely responsible for the efficient manner in which equipment may be maintained and operated.

Owen D. Young has very truly said: "Time and brawn alone are not factors by which the barometer of productivity can be forecast: the problem today is to deal with the limits within which men can work with zest and spirit and pride of accomplishment. When zest departs, labor becomes drudgery; when exhaustion enters, labor becomes slavery."

Modern tools help a man to feel that the organization of which he is a part, is an up-to-date organization, and the fact that he is given modern appliances with which to work is an incentive for him to demonstrate his ability to turn out more and better work. Men will not reflect that contentment and satisfaction with their jobs if physical effort is largely depended upon to perform labors and duties that should be lightened by the use of modern appliances. Conferences for the training of foremen



Convenient storage of paints is an important factor in shop cleanliness



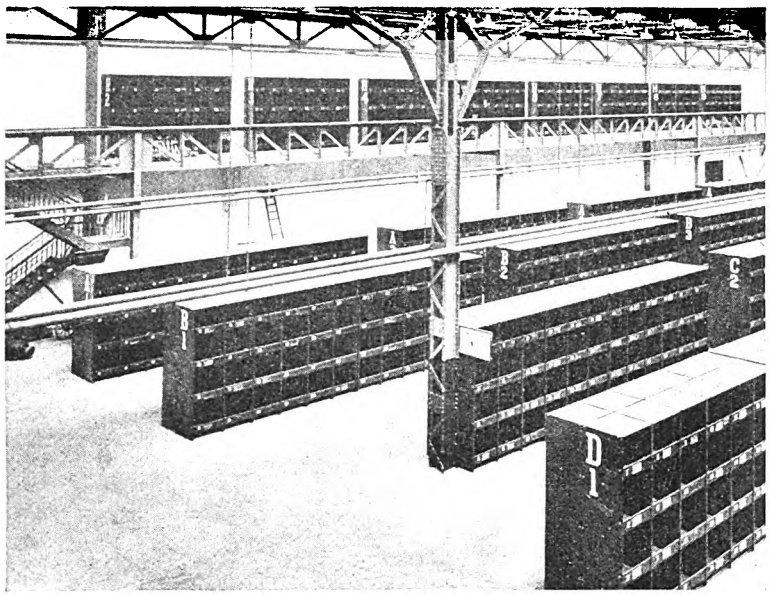
Numerous and convenient hoists save much time and labor

Digitized by Google

and workmen have come much to the fore in recent years, and they have accomplished much toward inspiring men with a higher conception of their jobs. How much more enthusiasm could be aroused in the individual, if, coupled with this training, he is supplied with the proper tools with which to carry out any ideas he may have acquired through these conferences in the matter of increased efficiency or improved methods of operation.

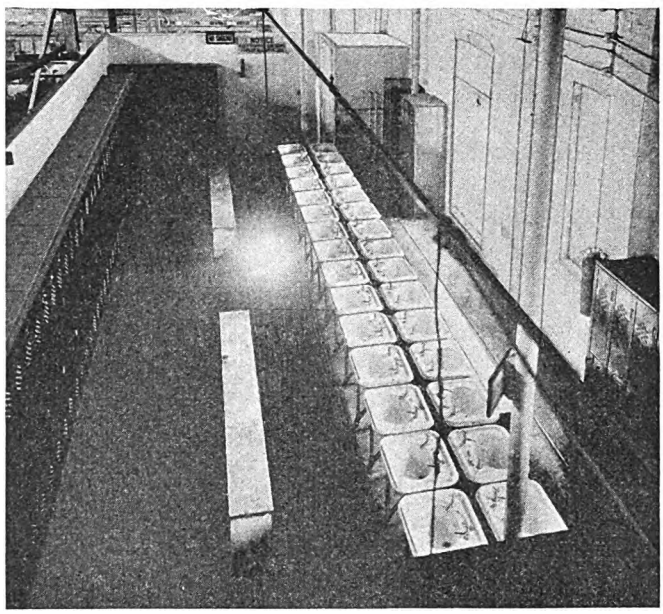
It is rather a sad reflection that, in the past development of the street railway industry, too little attention was given to the study of labor conditions, with the result that on many properties men are required to perform the work of maintenance in surroundings and with tools that thoroughly discourage the creation of a lively interest on the part of the men.

Shops should be laid out and arranged so as to provide proper light, ventilation, and sanitation. The cost of these and many other conveniences that can be supplied to the workman will be more than justified by the



Adequate storeroom facilities contribute greatly to the efficiency of the shop

First-aid cabinet and bulletin board remind employees of the importance of safety



Lockers and washing facilities are an important part of the shop equipment

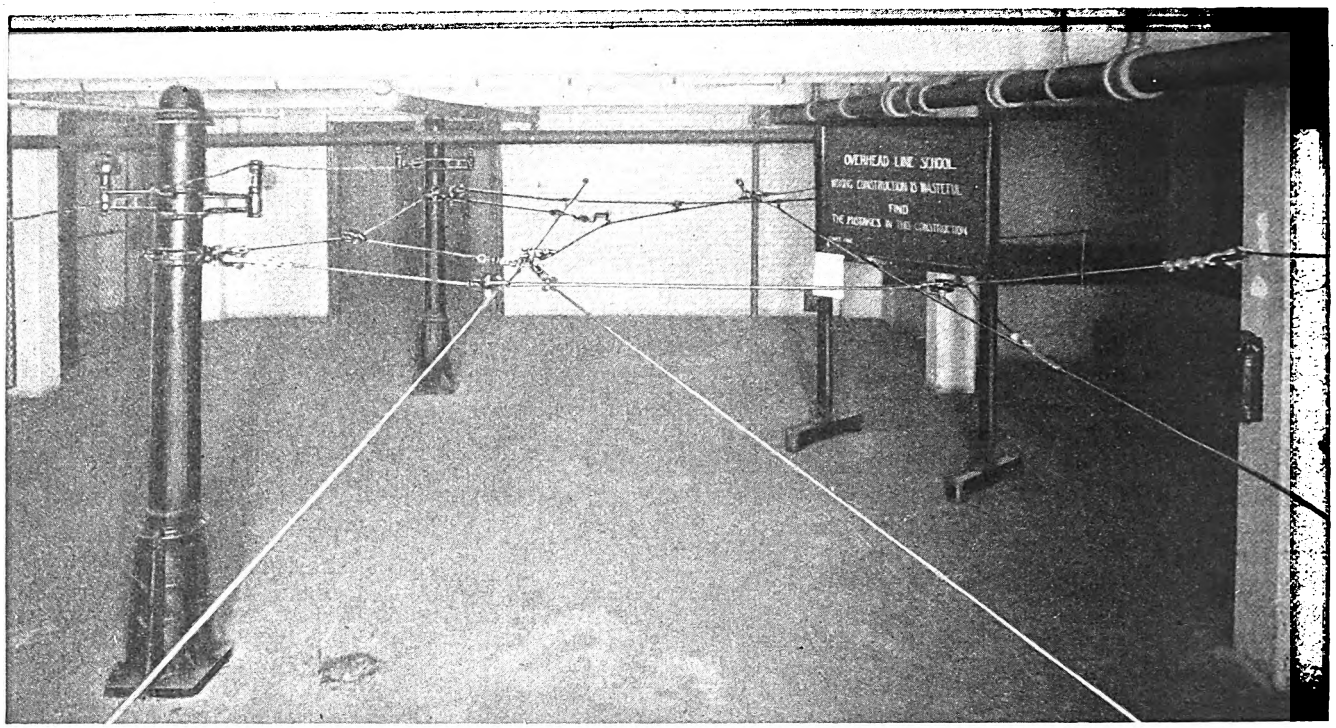
increased mental and physical effort exerted in his work, and the building-up of an invaluable morale in the organization. Work, under conditions and surroundings that are pleasant and comfortable, no matter how hard, does not produce that feeling of fatigue and restlessness that accompanies labor performed under conditions that are far from ideal. A contented employee is an asset, for contentment breeds good will. These attributes, in turn, are contagious, and are forerunners of a spirit of co-operation, that, if fostered, will go a long way in any organization toward solving the problem of successful and economical operation.

No company can render the best type of service unless it has a well-trained and enthusiastic group of employees. This condition is particularly true of the electric railways; everything possible might be done in the way of improving equipment and service, but maximum results can never be obtained without the wholehearted co-operation of the men, of whom some are in the somewhat peculiar position of having to sell the product which they manufacture.

More Route Changes in Brooklyn

NEW surface car routings of the Brooklyn & Queens Transit Corporation in the vicinity of the Manhattan Bridge and Brooklyn Bridge plazas were made effective on Aug. 25, contributing to traffic relief at the bridge approaches and allowing an improvement of street car service. These changes follow an extensive rerouting in the Borough Hall section, completed on April 6.

Digitized by Google



Demonstration school of Cleveland Railway where linemen familiarize themselves with details of overhead construction

Instruction School for Linemen

Since the establishment of training facilities the Cleveland Railway has decreased the number of trolley wire breaks and reduced expenditures for overhead materials and supplies

By Angus Scott
Assistant Superintendent of Overhead Lines, Cleveland, Ohio

REALIZING that the secret of efficient line construction and maintenance lies solely in the knowledge possessed by the workmen of their daily tasks, the line division of the Cleveland Railway has developed a method of training its employees which has proved effective. If workmen can be told how to do a certain job, and also see the act performed on a model at the same time, they are far better able to fully understand the problem than if they are merely told how to do the work. With this point in mind, a small scale model of actual overhead construction has been erected in the basement of line division headquarters for the instruction of the linemen. As may be seen in the accompanying illustration, the wire is erected at a height comparable to working conditions on the towers of the line trucks and involves all the elements of a line—poles, feeder cables, span wires, frogs and crossings.

With this construction before them, the foremen and linemen are made familiar with the standard construction as shown in their standard books, and anything not clear in the book is instantly made clear through the model. How to locate switch frogs accurately, the proper method of making various ties, the location of breaks or grounds in telephone circuits, and innumerable other items can be discussed and performed by the men under supervision. Any new device or method of doing a job more quickly or efficiently can be tried out and demonstrated to the men.

Construction which is not standard, and that which embodies the use of excessive fittings, is also erected. Foremen, or those in charge of line trucks, are examined as to the details of this construction. They are then shown how a saving in both labor and materials may be effected by eliminating excess parts which would have to be periodically renewed, and by properly installing fittings so as to secure the maximum life. Correct construction is thoroughly explained to the men, with the end in view of having them understand the actual savings in dollars and cents which is brought about by obtaining the maximum life of fittings with a minimum amount of wear on the contact wire.

The model overhead plant is especially valuable in the instruction of drivers and helpers in the proper methods of installing overhead fittings, how to use their tools and how to handle blocks and tackle on a tower truck. This may be accomplished by having the men work in a small area bounded by wooden horses fashioned into a square by means of short timbers, giving the effect of a tower

Digitized by Google

table. New men are allowed to practice on the model instead of attempting to practice while working on the line. This model line, especially, proved its worth when it was necessary to practically double our working force when engaged in a rapid transit construction program.

The system of line maintenance, which is based on car movements, is explained to the men, and the stages at which different fittings are to be regarded as worn out are shown by attaching to the model actual fittings which have been removed from the line. The necessity for accurate judgment can be stressed by showing the effect on the contact wire when fittings have been allowed to remain too long in the line at acceleration points or other bad spots.

Apparatus such as wire gages, dynamometers, micrometer gages, and the use of tension-temperature charts are explained and used on the model construction. The use of these instruments results in construction which can be economically gaged and controlled, but the men using them cannot merely follow the instructions concerning their use, but must also know the "why" and "how" concerning them or our plan of procedure will be defeated.

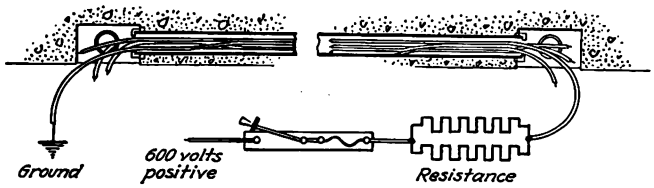
In the school, the physical characteristics of trolley wire are discussed with the men. Such facts as wire fatigue, breaking strength, expansion and contraction of wires with temperature variations are explained to them. Various samples of wire that have broken due to fatigue are shown, as are also samples of wire that should have been removed because of liability of breaking due to fatigue. In conjunction with the line school, a combined course in principles of foremanship and the elements of practical electricity is being conducted for the men.

That the school has fully justified the time and little investment put into it may be readily seen by the fact that all the major items of expense for line material such as ears, splicers, frogs and trolley wire, show considerable reductions from the previous year. A comparison of materials used during 1928 and 1929 shows a decrease of 3,020 ears during 1929. Inherent trolley breaks have also been decreased to a minimum.

Loosening Tight Wires in Conduit*

By R. S. McIntosh

Superintendent of Electrical Construction
Cleveland Railway



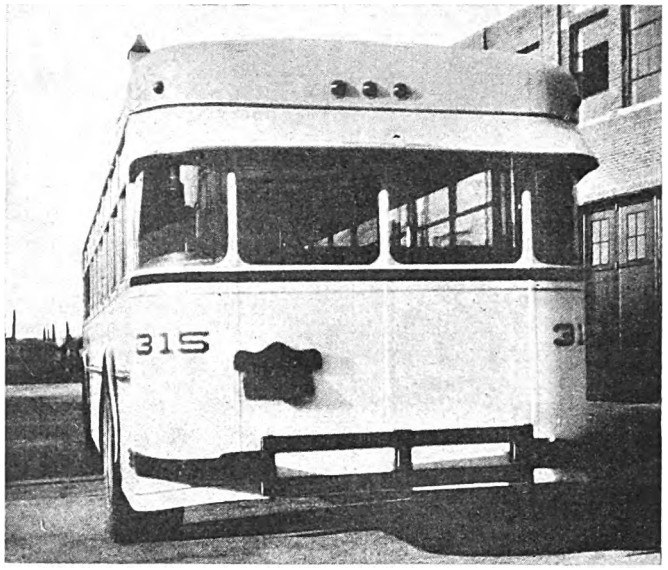
Heating tight wires in conduit, as done by the Cleveland Railway, softens insulation and makes removal easy

SOMETIMES wires laid in iron conduit, which after years of service have adhered tightly to the conduit walls, must be removed. The electrical maintenance division of the Cleveland Railway power department has devised a satisfactory method for loosening them when it is impossible to pull them out by ordinary means.

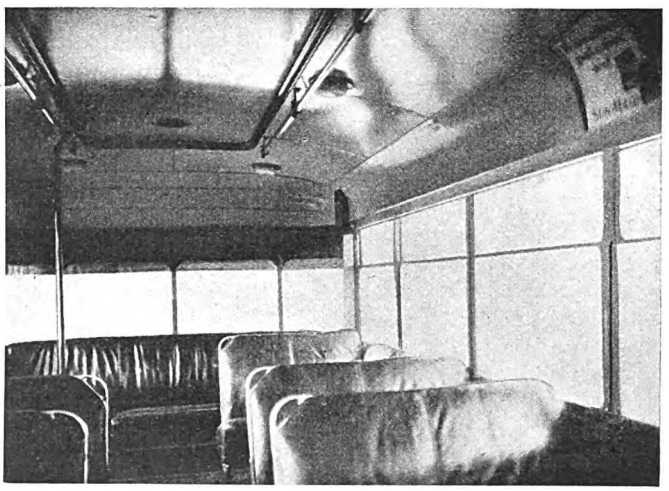
A bank of resistances with a capacity five to six times the current rating of the wire to be removed is placed in series with it through a fused switch, as shown in the diagram. The switch is then connected to the 600-volt line and the other end of the wire grounded. In a short time the heat developed in the wire so softens the insulation on it and on the other wires as well that they are pulled out easily. This method has been successful when wires were broken off so close to the pull boxes that no pulling was possible.

**Submitted in* Electric Railway Journal *Prize Contest.*

Exhaust Gas Fumes Discharged From Roof of Bus



Detroit D. S. R. bus equipped for roof discharge of exhaust fumes



An inconspicuous insulated casing carries the exhaust pipe up through the left rear corner of the bus

BY DISCHARGING the exhaust gases from the engines through the roof of the bus, the Department of Street Railways, Detroit, has been able to secure better ventilation and keep obnoxious fumes out of the interior and away from pedestrians as well. The gases are carried above the suction zone behind the vehicle so that they do not follow along with it.

The exhaust pipes from the two engines are joined at the left side of the bus into a single discharge pipe of square cross-section, and are carried upward to a point approximately 3 in. above the roof. Surrounding the exhaust pipe is a casing of 12-gage sheet steel, covered

Digitized by Google

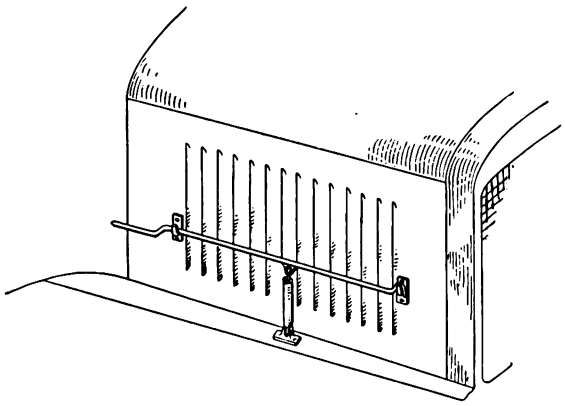
with a ¼-in. layer of molded fire-resisting material. This outer air space continues out to a point approximately 5 in. above the roof, ending in a flared cap. By this means a suction is created and cool air is drawn from within the bus into the air spaces around the exhaust pipe. This keeps the outer casing cool and eliminates any fire hazard or possibility of burning a passenger. Condensed vapors drain through a carbon-cleaning trap door with three ⅛-in. holes bored through it.

Road tests have shown that the exhaust gases are carried to a height sufficient to obviate inconvenience, and all objectionable noises have been eliminated. No added back pressure is evident.

Bus Hood Clamp Locks Easily*

By L. Rose
Cleveland Railway

IN ORDER to overcome the defects experienced with motor coach hood locks, a simple and inexpensive hood clamp has been developed by the Cleveland Railway. The hood locks were sometimes found difficult to latch, with the result that mechanics and operators developed a tendency to latch only those most conveniently located. It was also found that the hood locks were



Easily installed bar clamp reduces vibration and improves appearance

often unfastened by vibration. With either of these two conditions present, the hood would rattle or vibrate excessively.

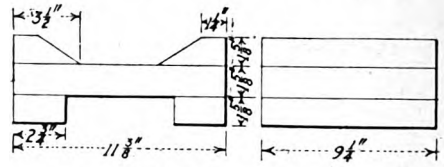
The hood clamp consists of a single bar which is pivoted at the center to a heavy-duty standard, sleeve-type hood-clamp body. This is fastened by means of a clevis bracket, which is bolted to the hood sill or the front fender in the regular manner. Two brackets are mounted on each side of the motor bonnet, one toward the front and one toward the rear which support the clamping bars and, in this way, securely lock the motor bonnet. By mounting the sleeve body on the hood sill close to the bottom of the hood, sufficient wedging action is obtained to prevent lateral vibration of the bonnet sides.

The bar clamp has been a satisfactory substitute for the hood locks by eliminating unnecessary noise due to loose hood sides and by reducing hood wear. The manipulation of the clamp is so simple and easy that it removes any temptation for the mechanics and operators to leave the hood unlocked.

**Submitted in* Electric Railway Journal *Prize Contest.*

Simple Cradle for Storing Armatures

TO KEEP armatures off the floor and prevent the windings becoming damaged by coming in contact with metallic chips or some other foreign substance the Richmond Railways, Staten Island, N. Y., has built a special cradle. It is made of oak and occupies a floor space of 11⅜x9¼ in. A 1⅝-in. plank 11⅜ in. wide by 9¼ in.



Since this armature cradle has been in service at the shop of the Richmond Railways failures have been reduced

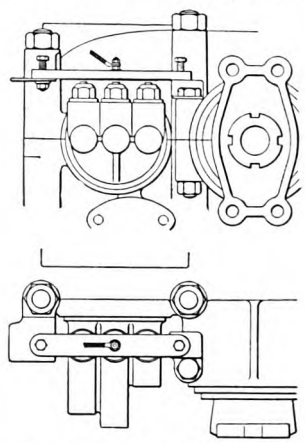
long is fastened to two rectangular blocks 2¾x9¼ in. Two tapered blocks bolted to the top of this plank directly over each foot provide a support for the armature and prevent rolling. These blocks are 1⅝ in. thick and 9¼ in. long. The bottom dimension is 3½ in. and the top 1¼ in., thereby providing a 2¼-in. taper.

Warning Signal Insures Proper Meshing of Gears*

By E. von Pirch

Hamburger Hochbahn Aktiengesellschaft
Hamburg, Germany

WEAR of transmission change gears on buses of the Hamburger Hochbahn Aktiengesellschaft was at times considerable. This was, to a great extent, due to the neglect of the operators to throw in the gear shift lever fully when changing speeds. As a result, the gear teeth did not mesh their full width, and were soon stripped by the excessive strain imposed upon them.



An electric circuit is completed through gear rods when gears are not fully meshed lighting a red lamp on the dash

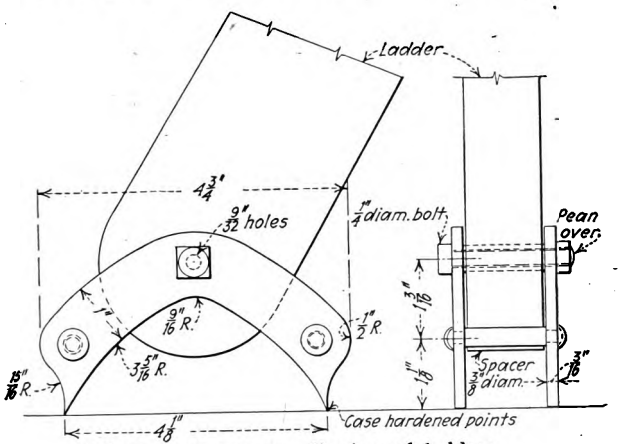
To correct this fault, a red lamp is placed on the dashboard and made to light whenever the gears did not mesh fully. This is accomplished by placing the gear rods in the circuit with the lamp by a simple electrical contact at the arresting pin. With the gears fully in mesh, the lamp is shunted, but when the gears are not fully in mesh the circuit is completed through the lamp. The device has not only reduced failures, but has lessened the time for overhauling gears in the shop and the number of buses out of service.

Digitized by Google

Steel Plate Safety Shoes Fitted to Ladders*

By Terance Scullin
Superintendent of Equipment and Buildings (Retired)
Cleveland Railway

LADDERS are prevented from slipping by a device designed and put into effective use at the Harvard Shops of the Cleveland Railway. By means of sharply pointed safety shoes, the foot of the ladder obtains a firm bearing against both vertical and horizontal forces.



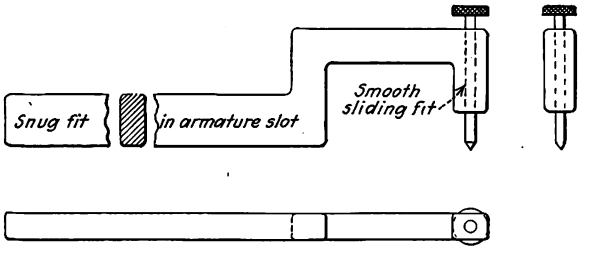
Safety shoes prevent slipping of ladders

The safety shoes consist of four U-shaped plates, two for each ladder leg, and are made of $\frac{3}{16}$-in. steel plate. The arms of the U's are brought to a point and hardened in order to increase their resistance to splitting or cracking. They are mounted at the end of the ladder leg on a toggle consisting of a $\frac{1}{4}$-in. bolt and a length of standard $\frac{1}{8}$-in. pipe. Two spacers made of $\frac{3}{8}$-in. steel rod keep the plates equidistant.

Gage to Check Alignment of Commutators

By J. S. Dean
Renewal Parts Engineering Department
Westinghouse Electric & Manufacturing Company

ONE of the essential factors for good commutation is the correct alignment of the commutator bar or mica with respect to the armature slot of the core. Depending upon the design of the armature windings of



Steel gage to check alignment of armature core slots with respect to commutator bar or mica

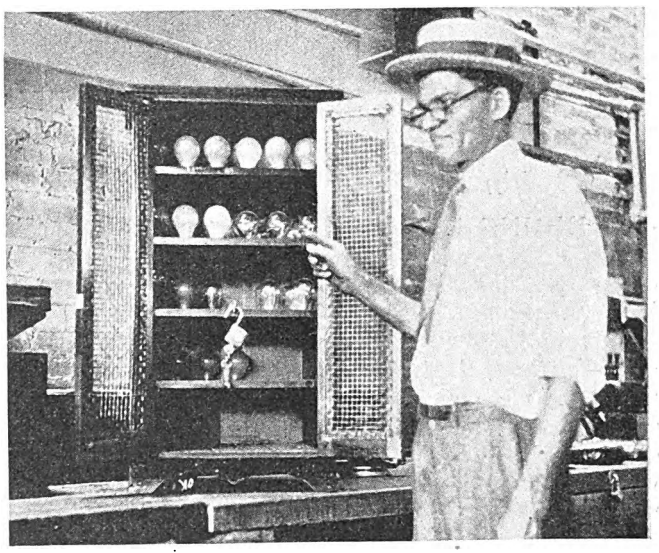
railway motors, the slots in the core should line up with either the commutator mica or the center line of the bar. For the various types of motors, this information should be obtained from the armature winding diagrams.

When refilling a worn-out commutator on a railway armature core with a new set of assembled segments, or replacing a new commutator, it is common practice to check its alignment by means of a piece of string held along the center line of the tooth or the slot of the core. This method of checking the assembly is more or less unreliable, as it depends entirely upon the accuracy of the workman's eye. A simple tool, designed as shown in an accompanying illustration, eliminates all doubt in connection with this work and provides a means to get the correct alignment of the commutator bar or mica with respect to the armature core slot. It is possible, for certain types of machines, to simplify this tool, by making the center point a part of the main body of the tool, which would eliminate the knurl headed sliding pin. Such a tool can readily be made at a very moderate cost and should prove to be a good investment for better maintenance.

Storage of Lamps During Car Overhaul*

By C. B. Hall
Chief Clerk Mechanical Department
Virginia Electric & Power Company, Norfolk, Va.

FOR the storage of electric bulbs during car overhauling periods, a convenient portable cabinet has been made in the shops of the Virginia Electric & Power Company at Norfolk, Va. The previous practice of allowing lamps to remain in their sockets while the car underwent an overhaul caused considerable breakage.



Handy cabinet used for the housing of lamps during the period of car overhaul

The plan of removing all lamp bulbs when cars are shopped has now been adopted, and the cabinet has been made for the special purpose of housing the lamps handily, pending their reinstallation in the cars on leaving the repair shops. The cabinet measures 16x19½x36 in., with five shelves having 1⅛-in. drilled holes to accommodate 150 lamps. A regular lamp socket with a non-threaded collar is placed on one side of the cabinet for a quick push-in test of each lamp prior to placing it on one of the shelves.

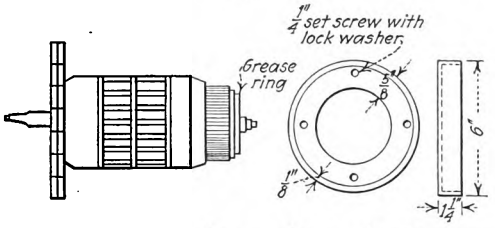
**Submitted in* Electric Railway Journal *Prize Contest.*

Digitized by Google

Grease Ring Protects Commutators on Ball-Bearing Motors*

By H. J. Beadle
Equipment Engineer
Dallas Railway & Terminal Company

GREASE and oil are very easily spattered upon the commutator and brush-holders of railway armatures of the ball-bearing type, especially during hot weather. To protect these parts, the Dallas Railway &



Brass cast ring fitted to ring nut keeps oil off commutator **and brush-holders** of ball-bearing armatures

Terminal Company has recently equipped the armatures of its traction motors with light-weight grease rings.

These grease rings are cast from brass and are attached to the armature ring nut which holds the commutator in position. They are held securely to the ring nut by four set screws with lock washers, lightly soldered to the ring nut.

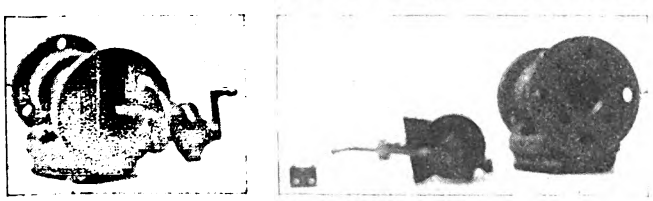
Since the installation of this device, the commutators and brush-holders have been free from grease and oil.

Slide Valve Grinder*

By C. W. Wood
Master Mechanic
Virginia Public Service Company
Hampton, Va.

GRINDING in of slide valves of type D relays is facilitated by a device developed in the shops of the Virginia Public Service Company, Hampton, Va. It replaces the tiresome method of hand grinding in which the mechanic used a rod 8 in. long with a ½-in. crossbar soldered across the rod about ½ in. from one end. The crossbar was placed in the air port of the slide valve, and moved back and forth by hand until the valve was seated.

The new device consists of a pair of automobile



Valve grinding facilitated with a device equipped with **speedometer** reduction gears

speedometer reduction gears, equipped with a handle and a flywheel to which a connecting rod and eccentric pin are attached. The eccentric pin is ⅜ in. off center, giving the connecting rod a stroke of ¾ in. A crossbar, ⅛x⅛x½ in. is fitted to the connecting rod in such a manner that it is held securely in the port of the valve by the weight of the connecting rod.

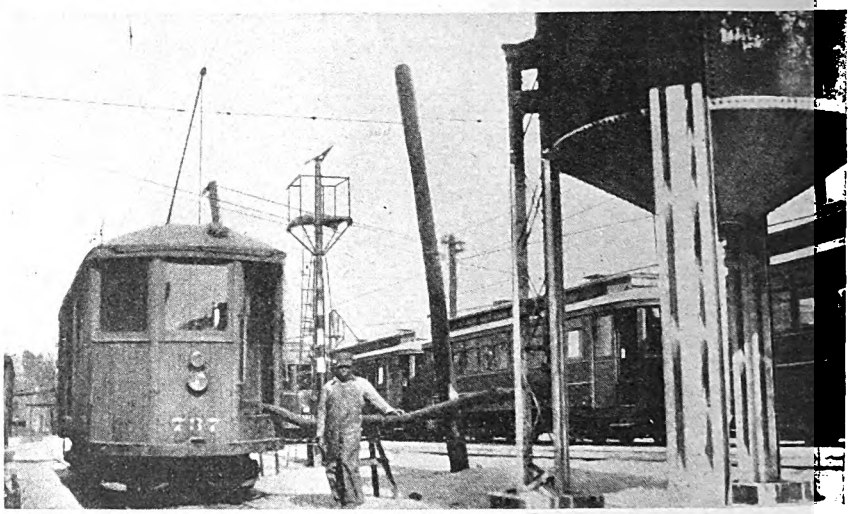
The grinder is bolted to one of the bracket bolt holes at the face of the relay casting by means of an angle bracket fitted with a stud. Pressure is applied through the bronze spring of the slide valve. To remove the valve from the port, it is necessary only to lift the connecting rod and give the handle one turn.

By slowly turning the crank by hand, ample speed is obtained at the valve through a gear reduction of three to one.

Track Sand Stored by Compressed Air*

By W. S. Yeates
Georgia Power Company, Atlanta, Ga.

TRANSPORTATION of dried track sand from a central drying plant to elevated steel storage bins in various carhouses and storage yards has been accomplished on the Atlanta railway system of the Georgia Power Company by means of an old car equipped for the purpose with a 12-cu.yd. steel tank, a 160-cu.ft. air



Elevated storage tank filled from loading car

compressor, two 4-in. rubber discharge hose and the necessary pipe lines and valves.

Sand is loaded into the car at the drying plant by inserting a hose into the tank through a cap which projects above the roof and forcing the sand through it by means of air pressure. In unloading the sand from the car to the elevated storage bins, air pressure is introduced above the sand in the tank by means of a pipe line from the compressor to the top of the tank. This pressure in the tank forces the sand through the discharge hose and up into the storage bin.

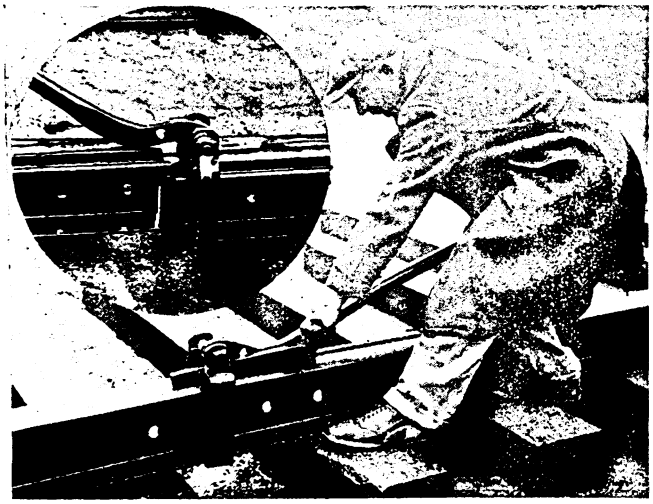
Each 4-in. discharge hose is provided with an auxiliary air line and a special butterfly valve which is located between the tank and the point at which the auxiliary pipe line is connected to the discharge hose. After the storage bin has been filled, the butterfly valve is closed, stopping further discharge from the tank. The auxiliary air line is then opened to clean the hose and loading pipe of the storage bin of any sand remaining in them. This prevents waste of sand and leaves the hose empty.

Digitized by Google

Leveling Bar Facilitates Joint Alignment*

By William Anthony
General Track Foreman Cleveland Railway

LEVELING and aligning of rails at the joints for the installation of splice bars is facilitated by a joint-leveling bar designed by the Cleveland Railway. Previously a track jack and a lining bar were used for



One man can do the entire job of splicing in a short time. The insert shows the leveling device that makes it easy to bring rails to proper alignment before attaching splice bars

the purpose. This method required the services of two men, who often experienced difficulty in bringing the rails to the proper level and alignment. One man can use the new joint-leveling bar, which can readily be placed and fixed firmly in position. The entire work of splicing takes only 1½ minutes with the new device.

The bar, as shown in the illustration, consists of a lever that rests and pivots on the high rail. At the end of the lever is a pair of clamps that fit under the base of the low rail. The fulcrum is in such a position that very little force is necessary to bring the lower rail to the proper level. After the rails have been brought to the same height, a slight lateral motion of the lever is all that is necessary to bring them into alignment. A steel wedge is then placed between the cross member of the bar and the rails, holding them firmly in place and allowing the splicing to proceed without difficulty.

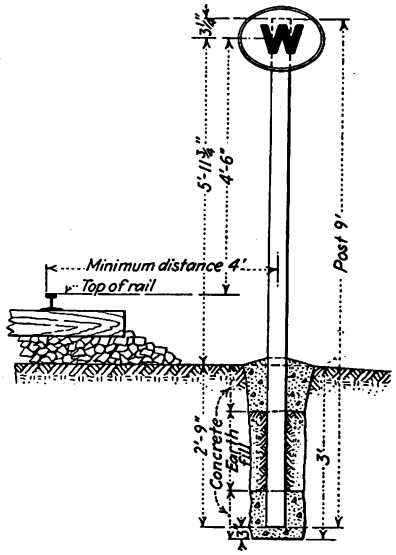
Old Rail Makes Satisfactory Whistle Post

By Joseph M. Hysan
Bridge Engineer United Railways & Electric Company Baltimore, Md.

ON THE Sparrows Point interurban line of the United Railways & Electric Company of Baltimore the conventional wood whistle posts which required frequent repainting and renewals have been replaced by metal posts utilizing pieces of old T-rail. The design consists of an oval-shaped casting of gray iron with the letter "W" and the outer rim raised ¼ in. above the surface. The letter and the outer rim are painted black and

**Submitted in* Electric Railway Journal *Prize Contest.*

Whistle post made of old T-rail is used on Sparrows Point interurban line of United Railways & Electric Company of Baltimore

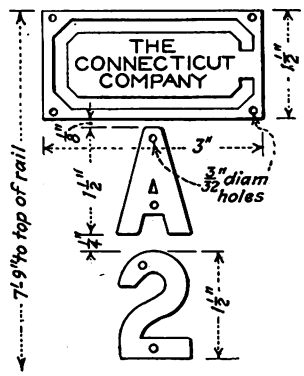


the background white. This disk is fastened to a piece of 60-lb. scrap T-rail cut to proper length and set in concrete. Some of these posts have been in service for about five years and are in perfect condition today.

Marking Wood Poles for Identification

MARKING of wood poles to show ownership and identification numbers is done on the lines of the Connecticut Company by means of aluminum plates, letters and figures. A plate carrying the company's monogram is placed on the pole, in connection with an identification composed of letters and figures. All of these are made of No. 28 gage aluminum sheet. On the plate the letters are raised $\frac{1}{32}$ in. above the body. The single letters and numbers are raised $\frac{1}{16}$ in. and have all corners rounded. They are held to the pole by No. 12 gage oval-head diamond point aluminum nails, 1 in. long. These markers are placed on the street half of the pole, 45 deg.

Aluminum name plates and figures are used to identify wood poles of the Connecticut Company



from the perpendicular line facing the direction of traffic, for span construction. Where bracket construction is used, they alternate every other pole.

Where the Connecticut Company has rights on wood poles of another company, information is given by placing a nail with a raised letter "C" on top, on the pole. These nails are made of No. 3 gage steel wire 2½ in. long. In addition to the identification, a dating nail denoting the year in which the pole is set is driven in each wood pole not higher than 3 ft. above the ground line, on the street side. This practice has been found to be cheaper than painting the markings on the poles.

Digitized by Google

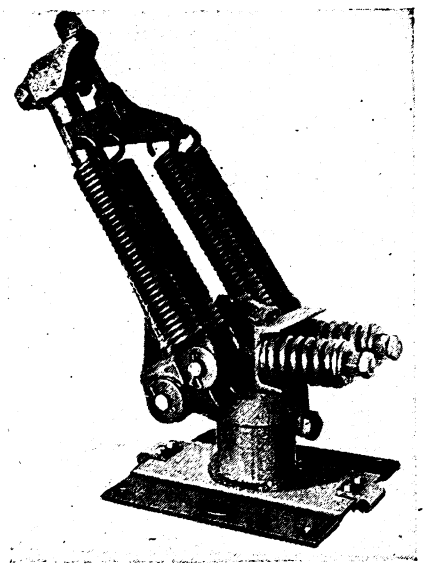
Digitized by Google

standard-size nut, having the same thread as the jaw, is beveled off. The nut is then screwed on to the bottom truck connection and the jaw screwed on until it comes against the beveled face. The jaw and nut are then welded together. This procedure lengthens the threaded portion of the jaw about 2 in., making it better than new and bringing the bearing on new screw threads of the adjusting bar. If the thread of the nut that has been welded on begins to wear, all that is necessary is to cut off the nut and weld on a new one. This process can be continued as long as the truck connection and jaw remain serviceable.

NEW PRODUCTS for the Railways' Use

Light-Weight Trolley Base

REDUCTION in weight over the lightest of iron bases has been attained by the light-weight trolley base designed by the Westinghouse Electric & Manufacturing Company. It is designated as the Type US-24-A trolley base, and has been produced for use on city, suburban and interurban cars.



This trolley base weighs only 77 lb., complete with spring buffer

Weight reduction has been attained without sacrifice in strength by using rolled steel for the base, heat treated steel tubing for the pole socket, and cast steel for the turret. It is claimed that the reduction in weight of moving parts thus secured quickens the action of the pole and permits lower wheel pressures, while the inherent ability of the steel to absorb shock minimizes noise of operation.

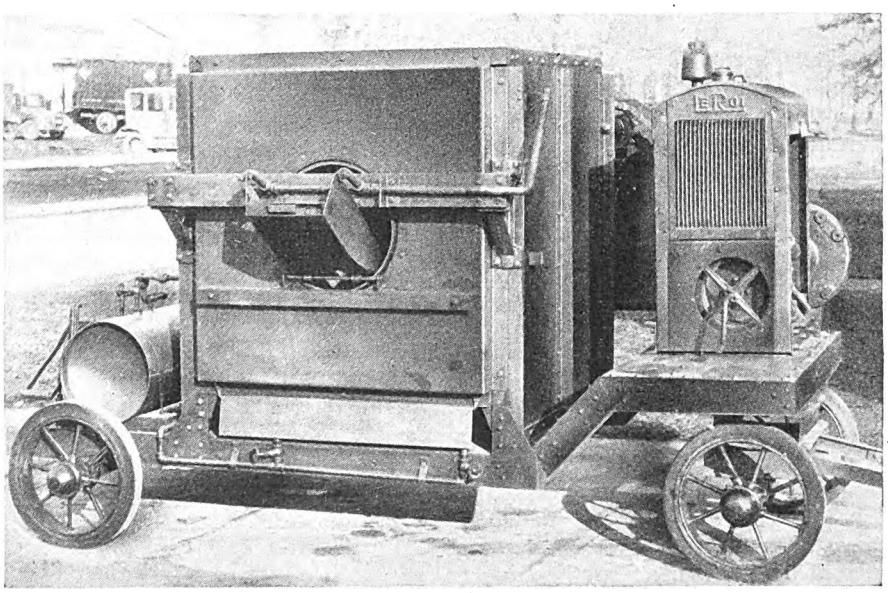
An important feature embodied in the construction is the use of Timken tapered roller bearings, there being two sets, one in the top and one in the bottom of the swivel. They are separated by a spacing bushing, and support the heavy cocking load due to the weight of the pole, harp and wheel and wheel pressure. This bearing pressure is distributed over the entire surface of the tapered rollers in a virtually perpendicular direction to the bearing surface. The tapered roller bearings also support the turret and thus prevent the bulk of the weight from being carried on the axle pin. By loosening one heavy locking screw in the flange of the turret the base can be lifted apart to expose the swivel bearing assembly. A nut on the end of the swivel permits adjustment of bearings.

The trolley base was designed to meet, with ample factor of safety, the maximum requirement of 1,000 amp. for momentary current carrying capacity, 750 amp. for continuous current carrying capacity, and operating wheel pressure on the contact wire up to 35 lb.

Portable Sand Drier and Mix Reheater

THE necessity for rapidly heating and drying sand or stone, or for reheating premixed and natural asphaltic paving materials, can be met with a new type portable heater which has been developed by the White Manufacturing Company, Elkhart, Ind. The heater consists of a rotating drum with internal cascading blades, mounted on self-aligning ball bearings and inclosed in a steel housing. A single-cylinder, 4 hp., radiator-cooled engine rotates the drum by means of a hardened roller chain.

An important feature of this machine is the indirect application of heat from two self-generating kerosene burners, located within the steel housing underneath the rotating drum. These burners apply the heat effectively on the outside of the drum so that no high temperature flame comes in contact with the drying or heating materials. This is said to be especially valuable in handling bituminous mixes, which can be very



Inclosed drum prevents contact of material with flames from burners

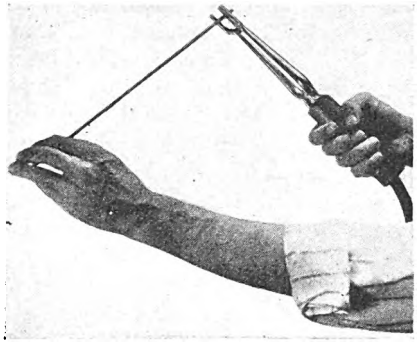
Digitized by Google

easily damaged in open-flame type heating.

The heater is equipped with a steel towing tongue and is mounted on rubber-tired steel wheels with roller bearings. Kerosene is stored in a 30-gal. welded steel tank to which pressure is supplied by a 3-in. hand-operated air pump.

Light-weight Holder for Electric Welding

SEVERAL new features are incorporated in an electrode holder for arc welding brought out by the Stoody Company, Whittier, Cal. While the weight is only 17 oz., the holder is constructed of steel forgings with a turned composition fiber handle, and the conductor cable is attached to it without the usual process of sweating in or soldering.



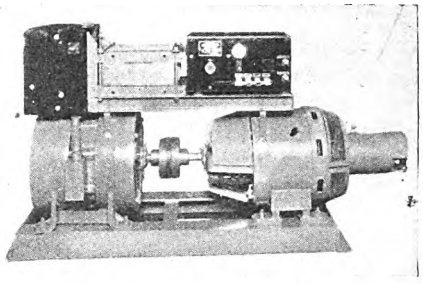
Electrode waste is small with this narrow-jaw holder for electric welding

The three jaws are corrugated, each at a different angle, so that the electrode may be held securely at any working angle. The holder arms are made of a special alloy steel, and are nickel plated and buffed. The spring tension is sufficient to hold electrodes from $\frac{1}{8}$ in. to $\frac{5}{16}$ in. or even greater diameter. The holding jaws remain parallel regardless of the size of the electrode, and the tension pressure extends through the entire length of the prongs.

The principal feature claimed for this holder is the narrow jaw which permits the use of the electrode with a waste of less than $1\frac{1}{2}$ in.

Large-Capacity Welder

DEMANDS for a high welding current to be used with large-size metallic and carbon electrodes have been met by a welder recently placed on the market by the Lincoln Electric Company, Cleveland, Ohio. This welder may be had in either the portable-truck type or stationary-truck type. It is a motor-driven, single-operator, variable-voltage machine, and has a current range of from 180 to 750 amps. The motor and generator are direct connected and the working mechanisms of all controls are contained in a ventilated, inclosed steel cabinet with hand regulators and switches mounted on a panel which forms a side of the cabinet. The control panel contains rheostats, diverter switch, safety starter switch, volt-ammeter and wing nut terminals for cables. The control cabinet is mounted directly over the motor-generator for easy access by the welding operator. This arrangement permits the removal of the motor-generator armature without disturbing any other parts.



Control mechanisms conveniently arranged above motor-generator set for welding

The facility with which the lead cables may be connected to the wing nut terminals lessens necessity for a polarity reversing switch.

Improved Marathon Ear Reduces Wheel and Wire Wear

WITH the purpose of still further reducing the wear on trolley wire, ears and wheels, the Ohio Brass Company, Mansfield, Ohio, has just put on the market a new ear having tapered sides and known as the improved Marathon. In place of the shorter and more abrupt approach-and-leave of the old type ear the improved Marathon has a long, gradual, tapered approach-and-leave. The tapered approach permits the trolley wheel to pass on to the ear without bounding from the wire, to ride easily over the ear and to pass from the ear to the wire without any abrupt pounding action. The whole wheel passage is said to be smooth and continuous.

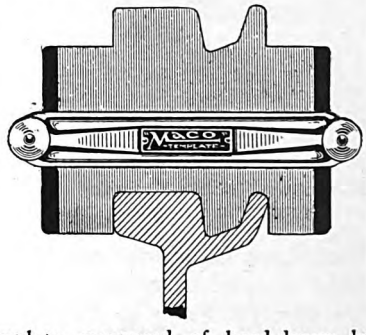
Tapering begins at the end with practically knife-edge thinness and, in the 15-in. ear, extends almost 4 in. toward the center section. Because of the long, tapered approach, it has been possible to increase slightly the section at the center, the point of greatest wear. This makes no appreciable difference in the peening qualities but adds materially to the service life of the ear. The tapering has been effected by means of special milling equipment which cleanly cuts the metal and insures uniform smoothness and precision.

Improved Marathon ear affords easy approach to trolley wheel

Service tests have indicated that because of the smooth wheel passage, arcing and pitting of the wheel, ear and wire have been eliminated with the result that better and longer service is obtained from each.

Maco Template for Registering Rail Contours

DETERMINATION of rail contours is accomplished accurately and easily by means of a registering template made by the American Maco Template Company, Inc., New York City. This is composed of a number of fine strips of hard-drawn brass held in an aluminum frame. The thickness of each strip is 0.007 in. The laminations are held in position by two special clamps which are fitted with sections of corrugated rubber. When a profile is required, all that is necessary is to loosen the screws and gently press the adjustable template against the contour. The result of such pressure is that the laminæ take a perfect outline of the surface against which they are pressed, their extreme thinness materially assisting in the facility and precision of the process. When the impression is complete, the laminæ are held in position by merely locking the screws. From the template thus produced other permanent templates may be made or a record of the section of the profile may be kept and filed for future reference.



Template composed of hard-drawn brass strips facilitates the registering of rail contours

Digitized by Google

Monthly and Annual Financial Reports

	Key System Traction Co., Oakland, Cal.		Fort Wayne & Lima R.R., Fort Wayne, Ind.		Holyoke Street Railway, Holyoke, Mass.		Saginaw Transit Company, Saginaw, Mich.		United Traction Co., Albany, N. Y.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$7,106,920	$7,239,063	$456,265	$445,822	$703,745	$759,104	$656,860	$639,692	$2,564,700	$2,655,840
Railway operating expenses	6,565,270	6,403,389	425,500	398,912	605,026	652,234	486,064	486,634	2,312,818[1]	2,531,813[1]
Net revenue, railway oper.	$541,650	$835,674	$30,765	$46,910	$98,719	$106,870	$170,796	$153,058	.....	.....
Taxes	438,655	464,684	7,585	7,390	13,683	14,134	30,442	27,624	.....	.....
Operating income	$102,994	$370,990	$23,180	$39,520	$85,036	$92,736	$140,353	$125,433	$251,882	$124,027
Non-operating income	125,914	146,050	33	126	24,429	24,120	.....	.....	18,650	15,697
Gross income	$228,908	$517,041	$23,213	$39,646	$109,465	$116,856	$140,353	$125,433	$270,532	$139,724
Deductions from gross income	1,191,030	1,170,994	736	2,108	82,605	83,313	115,867	116,436	.....	.....
Net income	*$962,122*	*$653,953*	$22,477	$37,538	$26,860	$33,543	$24,486	$8,997	*$339,040*	*$634,879*
Operating ratio	0.924	0.885	0.923	0.895	0.860	0.859	0.740	0.761	.....	.....

	Brooklyn-Manhattan Transit Co., New York, N. Y.[8]		New York & Queens Co. Ry., New York, N. Y.		Third Avenue Railway, New York, N. Y.		Schenectady Railway, Schenectady, N. Y.		City Railway, Dayton, Ohio	
	1930[7]	1929[7]	1930[7]	1929[7]	1930[7]	1929[7]	1929	1928	1929	1928
Railway operating revenues	$60,700,981	$48,586,548	$921,950	$897,248	$15,090,262	$15,611,026	$1,709,588	$1,623,315	$950,997	$962,171[1]
Railway operating expenses	39,786,537	31,256,534	870,072[1]	761,483[1]	12,627,317[1]	13,060,525[1]	1,410,344	1,437,895	787,862[1]	741,447[1]
Net revenue, railway oper.	$20,914,444	$17,330,014	.....	.....	.....	.....	$299,244	$185,420	.....	.....
Taxes	4,001,506	3,304,037	.....	.....	.....	.....	92,639	96,808	.....	.....
Operating income	$16,912,938	$14,025,977	$51,878	$135,765	$2,462,945	$2,550,501	$206,605	$88,612	$193,612	$220,724
Non-operating income	861,347	1,047,645	16,505	12,063	228,077	231,238	4,112	2,979	32,236	22,531
Gross income	$17,774,285	$15,073,622	$68,383	$147,828	$2,691,022	$2,781,779	$210,717	$91,591	$225,371	$224,225
Deductions from gross income	9,280,067	8,555,249	13,755	13,360	.....	.....	257,015	257,458	12,258	8,767
Net income	$8,494,218	$6,518,373	$54,628	$134,468	*$199,460*	*$286,333*	*$46,298*	*$165,867*	$213,113	$234,488
Operating ratio	0.656	0.643	.....	.....	.....	.....	0.825	0.886	.....	.....

	Lake Shore Electric Ry., Sandusky, Ohio		Erie Railways, Erie, Pa.		West Penn Railways, Pittsburgh, Pa.		Memphis Railway, Memphis, Tenn.		Northern Texas Traction Co., Fort Worth, Tex.	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Railway operating revenues	$1,871,693	$1,899,166	$1,214,362	$1,167,146	$7,127,960	$6,863,033	$2,915,090	$2,922,428	$2,514,379	$2,623,044
Railway operating expenses	1,704,566[1]	1,644,867[1]	791,496[1]	772,082[1]	3,508,720[1]	3,635,580[1]	1,997,052[1]	1,943,020[1]	1,676,132	1,675,502
Net revenue, railway oper.	.....	.....	.....	.....	.....	.....	.....	.....	838,247	947,542
Taxes	.....	.....	.....	.....	.....	.....	.....	.....	165,696	190,497
Operating income	$167,127	$254,299	$422,866	$395,064	$3,619,240	$3,227,543	$673,470[2]	$738,967[2]	$672,551	$757,045
Non-operating income	.....	.....	.....	.....	.....	.....	792	3,331	156,700	164,480
Gross income	$167,126	$254,299	$422,866	$395,064	$3,619,240	$3,227,543	$674,262	$742,298	$829,251	$921,525
Deductions from gross income	622,651	604,639	288,961	289,216	1,324,411	1,296,116	528,343	517,551	.....	.....
Net income	*$455,524*	*$350,340*	$133,905	$105,848	$2,294,829	$1,931,337	$145,919	$224,747	$293,170	$358,860
Operating ratio	.....	.....	.....	.....	.....	.....	.....	.....	0.666	0.649

	Havana Electric Railway, Havana, Cuba		Liverpool Corp. Tramways, Liverpool, England		Oslo Tramways,[4] Oslo, Norway		Mexico Tramways,[3] Mexico City, Mex.		La Plata Electric Tramways, La Plata, Argentina	
	1929	1928	1930[6]	1929[6]	1929	1928	1929	1928	1929	1928
Railway operating revenues	$5,694,051	$5,415,175	£1,602,228	£1,567,180	11,560,831	$11,320,800	10,724,937	$11,684,875	£117,798	£114,696
Railway operating expenses	4,608,568[1]	4,494,472[1]	1,392,526	1,292,419	8,404,594[1]	8,430,367[1]	10,176,013	10,393,765	91,109	85,208
Net revenue, railway oper.	.....	.....	.....	.....	.....	.....	548,924	1,291,110	.....	.....
Taxes	.....	.....	.....	.....	.....	.....	323,832	360,113	.....	.....
Operating income	$1,085,483	$920,703	£209,702	£274,761	3,156,237	2,890,433	225,092	930,997	£26,689	£29,478
Non-operating income	31,457	39,171	.....	.....	256,404	259,616	.....	.....	.....	.....
Gross income	$1,116,940	$959,874	£209,702	£274,761	3,412,641	3,150,049	.....	.....	£26,689	£29,478
Deductions from gross income	739,360	742,926	137,687	120,322	1,853,982	1,823,160	.....	.....	5,949	5,9292
Net income	$377,580	$216,948	£72,015	£154,438	1,558,659[5]	1,326,889[5]	.....	.....	£20,740	£23,549
Operating ratio	.....	.....	86.9	92.4	.....	.....	0.951	0.889	.....	.....

[1] Including taxes. [2] After depreciation of $244,568 in 1929 and $239,941 in 1928. [3] Figures in Mexican currency. [4] Figures in kroner. [5] Before depreciation. [6] Year ended March 31. [7] Year ended June 30. [8] Preliminary figures, including Brooklyn & Queens Transit System.

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Key System Transit Co., Oakland, Cal.					
May, 1930	572,548	530,588*a*	.....	50,596	.....
May, 1929	596,646	550,215*a*	.....	56,638	.....
5 mo. end. May, 1930	2,813,197	2,647,717*a*	.....	207,776	.....
5 mo. end. May, 1929	2,897,664	2,735,811*a*	.....	210,240	.....
Market Street Railway, San Francisco, Cal.					
July, 1930	735,453	649,901*a*	.....	85,552	32,534*b*
July, 1929	781,241	660,985*a*	.....	120,256	60,687*b*
12 mo. end. July, 1930	9,462,944	7,965,902*a*	.....	1,497,042	820,421*b*
12 mo. end. July, 1929	9,582,725	8,178,553*a*	.....	1,404,172	676,980*b*
Denver Tramway Corp., Denver, Colo.					
6 mo. end. June, 1930	2,038,224	1,402,195	245,166	413,917	163,206
6 mo. end. June, 1929	2,119,250	1,441,482	247,441	455,102	196,578
6 mo. end. June, 1928	2,142,946	1,417,089	258,480	491,316	242,210
6 mo. end. June, 1927	2,189,368	1,217,759	255,730	740,734	494,756

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Jacksonville Traction Co., Jacksonville, Fla.					
June, 1930	79,087	69,132	8,716	881	.....
June, 1929	90,651	74,708	8,969	6,392	.....
12 mo. end. June, 1930	1,095,016	898,172	106,665	83,921	*71,399*
12 mo. end. June, 1929	1,170,896	948,063	106,554	110,024	*50,450*
Honolulu Rapid Transit Co., Honolulu, Hawaii					
June, 1930	83,919	49,362	9,149	26,429	15,104
June, 1929	84,625	47,694	7,932	29,999	18,776
6 mo. end. June, 1930	516,747	306,524	53,246	164,523	93,497
6 mo. end. June, 1929	527,607	303,303	58,328	172,534	105,238
Chicago Surface Lines, Chicago, Ill.					
July, 1930	4,535,460	3,897,075	.....	638,384	*50,242g*
July, 1929	5,077,970	4,097,625	.....	980,345	103,191*g*
Des Moines Railway, Des Moines, Iowa					
June, 1930	156,290	123,742	.....	32,547	*22,619*

Digitized by Google

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Boston Elevated Railway, Boston, Mass.					
June, 1930	2,550,775	1,820,728	116,406	622,254	*113,749*
June, 1929	2,654,942	1,867,539	130,009	662,217	*32,187*
3 mo. end. June, 1930	8,188,784	5,704,615	390,818	2,127,490	*13,643*
3 mo. end. June, 1929	8,549,863	5,804,333	424,992	2,344,012	257,192
6 mo. end. June, 1930	17,042,375	11,704,519	794,832	4,601,403	378,560
6 mo. end. June, 1929	17,557,690	12,021,888	862,952	4,715,381	523,611
Boston, Revere Beach & Lynn R.R., Boston, Mass.					
3 mo. end. June, 1930	320,409	249,935	9,000	62,041	23,676
3 mo. end. June, 1929	321,118	247,981	9,950	63,694	26,452
6 mo. end. June, 1930	600,960	497,989	18,000	86,091	14,449
6 mo. end. June, 1929	600,456	483,925	20,000	99,573	25,795
Eastern Massachusetts Street Railway, Boston, Mass.					
July, 1930	617,220	435,884	25,164	166,518	3,926
July, 1929	686,923	467,879	29,281	207,566	44,884
7 mo. end. July, 1930	4,707,144	3,001,233	206,606	1,569,479	349,842
7 mo. end. July, 1929	5,124,412	3,168,119	228,862	1,856,294	582,573
Union Street Railway, New Bedford, Mass.					
3 mo. end. June, 1930	283,535	258,313	15,000	10,416	4,872
3 mo. end. June, 1929	319,374	273,272	15,000	31,556	27,800
6 mo. end. June, 1930	578,536	536,442	30,000	12,461	974
6 mo. end. June, 1929	633,532	556,826	30,000	47,665	40,792
Berkshire Street Railway, Pittsfield, Mass.					
3 mo. end. June, 1930	160,254	140,093*a*	.....	20,161	*51,756*
3 mo. end. June, 1929	171,135	151,478*a*	.....	19,657	*53,912*
6 mo. end. June, 1930	357,594	290,361*a*	.....	67,233	*76,618*
6 mo. end. June, 1929	373,816	309,687*a*	.....	64,129	*83,077*
Springfield Street Railway, Springfield, Mass.					
3 mo. end. June, 1930	618,438	483,448	.....	127,137	57,249
3 mo. end. June, 1929	683,042	561,942	.....	113,650	40,941
6 mo. end. June, 1930	1,294,357	998,890	.....	280,114	138,976
6 mo. end. June, 1929	141,256	111,279	.....	274,915	129,132
Worcester Consolidated Street Railway, Worcester, Mass.					
3 mo. end. June, 1930	711,795	532,442	.....	163,312	60,712
3 mo. end. June, 1929	765,696	577,411	.....	172,128	55,764
6 mo. end. June, 1930	1,501,506	1,087,701	.....	381,721	172,287
6 mo. end. June, 1929	1,581,376	1,169,160	.....	379,628	147,924
Kansas City Public Service Co., Kansas City, Mo.					
July, 1930	63?,205	573,990*a*	.....	61,215	*21,365b*
July, 1929	714,415	591,213*a*	.....	123,202	48,094*b*
7 mo. end. July, 1930	4,914,435	4,151,367*a*	.....	763,067	550,144*b*
7 mo. end. July, 1929	5,232,681	4,229,055*a*	.....	1,003,625	550,269*b*
Illinois Terminal Co., St. Louis, Mo.					
June, 1930	566,548	411,954	32,684	121,910	86,421*d*
June, 1929	622,436	422,904	21,762	177,770	134,940*d*
6 mo. end. June, 1930	3,628,998	2,516,706	155,527	956,688	698,042*d*
6 mo. end. June, 1929	3,913,248	2,687,400	130,608	1,095,113	826,416*d*
Omaha & Council Bluffs Street Railway, Omaha, Neb.					
June, 1930	227,092	168,477	.....	28,393	*16,838*
June, 1929	219,075	162,778	.....	32,188	3,920
International Railway, Buffalo, N. Y.					
6 mo. end. June, 1930	5,078,809	4,370,742*a*	.....	756,007	122,765
6 mo. end. June, 1929	5,451,496	4,590,513*a*	.....	899,807	249,870
6 mo. end. June, 1928	5,538,871	4,622,947*a*	.....	934,599	240,032
6 mo. end. June, 1927	5,423,725	4,901,175*a*	.....	548,965	*176,272*
Cortland County Traction Co., Cortland, N. Y.					
3 mo. end. June, 1930	12,385	14,317	2,100	33,925	29,838
3 mo. end. June, 1929	11,050	10,991	2,100	36,795	32,904
Fonda, Johnstown & Gloversville R. R., Gloversville, N. Y.					
June, 1930	72,865	60,524	4,800	20,390	*12,940*
June, 1929	85,895	80,169	7,840	52,807	17,774
6 mo. end. June, 1930	484,717	377,702	28,800	116,547	*72,383*
6 mo. end. June, 1929	516,531	388,780	47,040	148,338	*46,488*
Brooklyn-Manhattan Transit System, New York, N. Y.*f*					
July, 1930	5,003,577	3,271,059	337,682	1,490,206	720,302
July, 1929	5,150,887	3,507,239	333,762	1,373,745	607,513
Brooklyn & Queens Transit Corporation, New York, N. Y.					
July, 1930	1,917,118	1,495,714	108,179	327,524	203,433
July, 1929	2,042,815	1,609,538	116,849	337,189	212,937
Hudson & Manhattan Railroad, New York, N. Y.					
July, 1930	954,538	202,515*a*	.....	452,023	116,747
July, 1929	985,313	510,735*a*	.....	474,578	138,602
7 mo. end. July, 1930	7,206,792	3,608,051*a*	.....	3,598,741	1,254,583
7 mo. end. July, 1929	7,271,946	3,672,638*a*	.....	3,599,308	1,247,032
Interborough Rapid Transit Co., New York, N. Y.					
July, 1930	5,382,547	3,880,434	198,549	1,303,563	*289,711e*
July, 1929	5,466,406	3,775,811	202,308	1,488,286	68,586
Long Island Railroad, New York, N. Y.					
June, 1930	3,662,765	2,167,013	345,934	1,148,961	994,968*d*
June, 1929	3,824,992	2,273,087	319,399	1,231,322	1,042,967*d*
6 mo. end. June, 1930	18,787,458	13,528,768	1,160,922	4,093,345	3,197,899*d*
6 mo. end. June, 1929	19,331,691	13,573,277	1,071,872	4,674,720	3,744,891*d*
New York Railways, New York, N. Y.					
June, 1930	478,122	412,151*a*	.....	64,971	25,810*c*
June, 1929	541,944	456,275*a*	.....	85,669	23,970*c*
6 mo. end. June, 1930	2,747,985	2,505,364*a*	.....	242,621	*1,085c*
6 mo. end. June, 1929	3,076,297	2,725,422*a*	.....	350,875	*10,606c*
New York, Westchester & Boston Ry., New York, N. Y.					
3 mo. end. June, 1930	672,478	361,081	77,905	236,335	*454,950*
3 mo. end. June, 1929	649,655	378,887	71,360	201,698	*441,754*
Staten Island Rapid Transit Co., New York, N. Y.					
June, 1930	224,989	161,999	17,000	45,990	39,052*d*
June, 1929	277,571	182,262	17,000	78,303	43,821*d*
6 mo. end. June, 1930	1,201,932	920,985	103,500	175,875	134,990*d*
6 mo. end. June, 1929	1,455,686	1,046,518	106,000	303,150	83,583*d*
Third Avenue Railway, New York, N. Y.					
July, 1930	1,429,731	1,116,731	95,581	241,457	2,067
July, 1929	1,507,861	1,228,496	97,511	206,065	32,467
Philadelphia & Western Ry., Norristown, Pa.					
May, 1930	61,065	.....	.....	.....	8,504
May, 1929	69,139	.....	.....	.....	14,047
5 mo. end. May, 1930	294,713	.....	.....	.....	32,033
5 mo. end. May, 1929	328,933	.....	.....	.....	58,226
Philadelphia & Western Railway, Norristown, Pa.					
July, 1930	50,893	.....	.....	.....	*470*
July, 1929	63,210	.....	.....	.....	3,906
7 mo. end. July, 1930	402,898	.....	.....	.....	39,560
7 mo. end. July, 1929	460,239	.....	.....	.....	81,154
York Railway, York, Pa.					
3 mo. end. June, 1930	725,297	446,319*a*	.....	278,978	201,242
3 mo. end. June, 1929	677,605	394,010*a*	.....	283,595	211,669
12 mo. end. June, 1930	2,930,732	1,673,772*a*	.....	1,256,960	939,675
12 mo. end. June, 1929	2,747,333	1,519,252*a*	.....	1,228,081	947,523
United Electric Railways, Providence, R. I.					
July, 1930	515,367	430,138	28,679	56,549	5,480
July, 1929	579,352	474,831	28,684	76,136	24,877
7 mo. end. July, 1930	3,957,999	3,335,151	224,874	397,973	39,756
7 mo. end. July, 1929	4,284,813	3,440,329	238,105	405,557	248,639
Memphis Street Ry., Memphis, Tenn.					
May, 1930	241,687	167,154*a*	.....	74,630	29,535*b*
May, 1929	251,459	179,855*a*	.....	71,609	28,065*b*
12 mo. end. May, 1930	2,875,851	1,994,446*a*	.....	932,366	396,428*b*
12 mo. end. May, 1929	2,919,018	1,967,640*a*	.....	954,509	433,200*b*
Galveston-Houston Electric Ry., Houston, Tex.					
June, 1930	45,659	25,708	2,565	17,383	.....
June, 1929	57,316	29,176	2,565	25,573	.....
12 mo. end. June, 1930	540,652	312,436	32,595	195,813	*74,054*
12 mo. end. June, 1929	609,311	321,302	31,717	236,291	*34,556*
Houston Electric Company, Houston, Tex.					
June, 1930	247,461	157,592	21,492	68,376	.....
June, 1929	280,162	174,322	25,121	80,617	.....
12 mo. end. June, 1930	3,259,700	2,056,556	258,932	973,587	589,240
12 mo. end. June, 1929	3,373,511	2,087,177	286,417	999,915	593,022
Edmonton Radial Railway, Edmonton, Alta.					
May, 1930	63,775	46,729	.....	17,046	*2,681*
May, 1929	65,923	44,079	.....	21,844	996
5 mo. end. May, 1930	368,550	238,439	.....	130,111	3,315
5 mo. end. May, 1929	372,146	224,449	.....	147,697	15,956
Havana Electric Railway, Havana, Cuba					
3 mo. end. June, 1930	1,331,067	1,095,636*a*	.....	240,566	82,264*b*
3 mo. end. June, 1929	1,486,833	1,161,977*a*	.....	332,718	171,754*b*
6 mo. end. June, 1930	2,687,130	2,244,476*a*	.....	453,794	135,907*b*
6 mo. end. June, 1929	2,864,581	2,285,997*a*	.....	593,610	271,673*b*

a Includes taxes. *b* Before depreciation. *c* Before income bond interest. *d* Net after rents. *e* Before dividends on Manhattan Railway guaranteed stock. *f* Including Brooklyn & Queens Transit Corporation. *g* Companies' share of divisible receipts.

New

Maintenance Contest

to Start Nov. 1

THE fifth annual Maintenance Contest conducted by ELECTRIC RAILWAY JOURNAL in conjunction with the American Electric Railway Engineering Association, will begin Nov. 1, 1930. More interest than ever before was shown in the contest which has just ended, and prospects are bright for keen competition next year. Full details concerning rules, etc., will be given in the October issue.

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Baltimore, Md.—The Sun Cab Company, which operates a large fleet of taxicabs here, has been ordered by the Maryland Public Service Commission to take out public liability insurance for the protection of its passengers on or before Sept. 8. The order fixes a minimum sum of $10,000 for a single passenger and $20,000 for more than one passenger. The company may, however, as an alternative provide and maintain a bond or cash indemnity reserve fund of not less than $100,000, based on the number of cabs in operation.

✦

San Francisco, Cal.—Seizing the opportunity to secure life insurance at exceptionally low rates by adding to the company free policy a small amount paid voluntarily by themselves, 2,304 out of 2,667 employees of Market Street Railway have taken out additional insurance amounting to about $3,350,500 in protection.

✦

Camden, N. J.—Public Service Coordinated Transport carries passengers from its Jersey Bus Terminal in Philadelphia to Central Airport, Camden, where passengers board the planes and are taken to Atlantic City. Buses are operated from Bader Field in Atlantic City directly to the Public Service Union Bus Terminal in that city. The service was started on Saturday, July 2, and 300 passengers sought to be accommodated. Two trips were scheduled between Philadelphia and Atlantic City. Ten trips were operated. When the service was started it was planned to operate only on Saturdays and Sundays. However, the demand for service has necessitated a daily schedule.

✦

Hartford, Conn.—The Connecticut Company has adopted the one-man system on its Rockville line preparatory to the substitution of buses under permission from the Public Utilities Commission when convenient to the company. The Rockville-Hartford line is divided into three zones.

✦

Chicago, Ill.—Special service direct to the National Air Races at Curtiss-Reynolds Airport was operated by the North Shore Line from Aug. 23 to Sept. 1, inclusive, with reduced round-trip rates. Service by train was to Northfield station on the Skokie Valley route and thence by motor coach to the grandstand.

✦

Haverhill, Mass.—The Massachusetts Northeastern Railway installed bus service on three lines on Aug. 20 under a 5-cent zone fare. It is expected that the lines in the vicinity of Haverhill will be entirely motorized by Sept. 7. Service by bus between Haverhill, Mass., and Plaistow, N. H., will be started on Sept. 3.

(*Late News Continued on Page* 598)

Seattle Municipal Having Its Own Troubles

Many Problems Plague City Officials. Employees Again Paid With Warrants Redeemable in Future. Attempt at Refinancing Unsuccessful

SEATTLE'S chances for refinancing its Municipal Railway debt through a new issue of long-time utility bonds are decidedly slender. So Mayor Frank Edwards, prime mover in the refinancing efforts, has admitted after conferences with investment bankers and advisors closely in touch with the bond market.

With the problem again acute because of the railway's inability to cover its current payroll with cash from revenues, and, at the same time, meet minor bond and interest payments, an entirely new program of relief probably will have to be devised.

Efforts have been under way for more than a year to assure a satisfactory market for about $10,000,000 in new street railway bonds, payable in about twenty years. This, it is figured, would wholly retire the balance of nearly $9,000,000 still owing to the Pudget Sound Power & Light Company on the purchase price of the railway system, under a short-term contract which has been temporarily relieved by the moratorium. It was counted upon, also, to provide means of extending street car lines, buy new equipment and rehabilitate the entire system. Mayor Edwards says he has been advised that "a straight out-and-out street railway bond issue would not be attractive to investors under present conditions in Seattle."

Meantime, members of the City Council are considering two plans for relief, one to include an item of about $200,000 in the 1931 city budget to assist the street railway department out of tax funds with the cost of maintaining paving and planking between street car tracks. Councilman Case declares the railway is burdened with the entire cost of maintaining the paving between tracks, whereas it should be required to maintain only about 18 in. along its rails where special paving is laid to permit of easy access to the rails when repairs are needed. He would relieve the railway of the burden of maintenance costs of $403,000 a year on paving between car

(*Continued on Page* 602)

The Business Outlook

AFTER about two weeks delay due to drought scare, the signals of the beginning of definite business recovery now flicker faintly amid the encircling gloom. This week nearly every important weekly indicator has turned upward. Steel activity, coal production and carloadings are up more than seasonally; electric power output is increasing slowly; building is resisting seasonal decline; general trade volume is rising nearer to normal levels; and commodity prices have ceased their rapid decline. To carry us beyond the seasonal hump during September, the upturn depends on whether the Federal Reserve will keep the credit clock wound up and whether business brains will jump energetically into the job after Labor Day.—*The Business Week.*

Five-Cent Local Fare Restored in Boston

For an experimental period of 30 days, beginning Sept. 1, the board of public trustees of the Boston Elevated Railway have authorized a reduction in the rate of local fares from 6¼ to 5 cents, without transfers.

The reduction of fare in local fare zones is prompted by the necessity of increasing riding in order to offset, if possible, the loss in riding from the use of the private automobile and present industrial conditions. These two factors together are estimated to have caused a reduction of 1,380,409 revenue passengers, about 5 per cent on the system during July, 1930, compared to July, 1929.

General Manager Dana said:

Under the law, the Boston Elevated must be operated on a service-at-cost basis. A decrease in revenue, due to a reduction in riding, can be met ultimately only through proper economies, or by an increase in the rate of fare, or by increasing riding. A reduction of $2,000,000 in operating expenses during the past three years, resulted in offsetting the reduction in revenues due to the decrease in riding. This reduction in the local fare rate is an effort to increase riding. It is hoped that this change will be successful and that no further adjustment in the rate of fare for local zones will be necessary.

The local rate of fare is of value for short rides throughout the Elevated system. There are 120 routes over which the local rate of fare is in effect. During the year ended Dec. 31, 1929, 56,272,366 passengers were carried at the local rate of fare. This represented almost 16 per cent of the total number of revenue passengers that year.

It is the earnest desire of the trustees to increase riding in local fare zones by offering a fare of 5 cents for such rides. It is hoped that this action will receive the co-operation of the public and that riding will be increased.

The change does not affect the rate of the regular fare or the transfer privileges at the regular fare.

Digitized by Google

LATE NEWS

(*Continued from Page* 596)

Salt Lake City, Utah.—Trolley buses are to be substituted for trolley cars by the Utah Light & Traction Company on the Capital Street line under an order of the Public Utilities Commission. Service with the new equipment will be in operation from South Temple and Main Streets and to the east side of the Capitol grounds, except during the winter, when the company may restore service by trolley if it so desires.

✦

Los Angeles, Cal.—Permission for the Los Angeles Railway temporarily to discontinue shuttle car operation on Santa Fe Avenue and Mateo Street between First and Seventh Streets and to substitute a bus service in order not to hamper construction of the Fourth Street viaduct has been granted by the Board of Public Utilities.

✦

Columbus, Ohio—Three street cars were destroyed, twenty others were damaged, and the roof burned off the Milo carhouse of the Columbus Railway, Power & Light Company, Aug. 22. The damage to the cars is estimated at $55,000 and to the building at $20,000. The building will be repaired immediately.

✦

Stockton, Cal.—The City Council has adopted the proposed harbor development plan of Colonel Allin, director of the port of Houston, and has authorized City Attorney J. Leroy Johnson to apply to the Interstate Commerce Commission to build a rail extension to the Rough and Ready island area. Thus the city has committed itself definitely to a policy of public ownership and control of railroad facilities' serving the future deep water harbor here.

✦

Springfield, Mass. — The Springfield Street Railway has discontinued bus service between Springfield and Westfield. In 1905 railway service was started between these two cities, but due to lack of revenue cars were withdrawn in 1928. When the new Apremont State Highway was opened only two months ago a bus service was started.

✦

Lawrence, Mass.—The Massachusetts Northeastern Street Railway has been authorized by the Public Utilities Commission to operate buses over twelve routes in Lawrence, Methuen, Merrimac, Amesbury, Haverhill, Salisbury and Newburyport.

✦

New York, N. Y.—The Board of Transportation is pursuing a policy of keeping sidewalks as free of subway entrance encumbrances as possible, especially in congested districts, and has set up a force of engineers to specialize in location and design of such entrances. This policy was applied not only to the new subway system now being built, but to the older lines wherever it was feasible to change locations. As a result, 59 entrances on the new system have been laid out in city parks, malls or through private buildings. In addition to these, 30 stairways that obstructed sidewalks at entrances to existing subways have been relocated on private property.

✦

Gary, Ind.—A new skip-stop system between Broadway and Colfax Street in West Gary and reduced running time between Gary and Hammond is in effect on the Hammond division of the Gary Railways. The skip-stop system eliminates a number of stops through Tolleston and West Gary where city blocks are short and the frequent stops slow up operation. The stops are staggered, eastbound and westbound blocks falling on alternate streets. With the introduction of the skip-stop system and with the improved roadway resulting from reconstruction, running time between Gary and Hammond has been reduced to 45 minutes, five minutes faster than the former schedule.

✦

Lynn, Mass.—The property of the Nahant & Lynn Street Railway, operated between Nahant and Lynn, was purchased at a public auction on Aug. 20, by the Eastern Massachusetts Street Railway for $13,500. The purchase includes the carhouse site, twelve cars and parcels of land along the right-of-way.

✦

Utica, N. Y.—The Public Service Commission has authorized the New York State Railways further to discontinue its shuttle line on Auburn Avenue from the intersection of Genesee Street and Auburn Avenue to the intersection of Prospect Street and Holland Avenue. This further discontinuance is effective until July 1, 1931. Since the suspension of the shuttle line in 1926 the Utica Railway Co-ordinated Bus Line, Inc., has operated buses over practically the same route. The company does not want to abandon the shuttle line altogether because it desires to await the development of the residential section at the end of the line.

✦

Pittsfield, Mass.—The Berkshire Street Railway has applied for a franchise for a cross-over from East Street to West Street here to permit direct connection with the New Haven Railroad, as part of plan of the General Electric Company to lease the route from the Berkshire Street Railway. The General Electric Company plans to direct its freight over the route daily between midnight and 6 a.m.

✦

Chicago, Ill.—The committees appointed to obtain deposit of Chicago Rapid Transit Company securities sent letters on Aug. 18 to all known holders of these securities, requesting deposits. The letters set forth that there is no great hope of an adequate return for the "L" without consolidation with the surface lines, but that with consolidation returns may be materially increased.

✦

Tacoma, Wash.—Bills of the municipal belt line for operation of buses past the obstruction to railroad traffic, caused by reconstruction of the Milwaukee Viaduct, have been passed by the Council at the full figure of $15,498. The bills cover the period of operation of buses from Feb. 10 to May 30, and when the full period of such operation is paid for, the total cost is expected to be $35,000. The cost of bus operation has been a heavy drain on the belt line. The financial straits of the belt line were pointed to as reason for liberal allowance for detouring traffic, and it was also argued, that, as bus service merely in the immediate vicinity of the construction job was impractical in combination with railway service, the belt line had to put in buses to make up the entire run.

✦

Seattle, Wash.—Unable to meet a semi-annual interest and principal payment of $421,360, due Sept. 1, on the purchase bonds, the municipal railway department has petitioned the Council or another loan from city light construction bond funds. The last loan extended to the railway system was from the city water fund, Jan. 1, 1929. It was for $800,000, but has been paid off with funds saved by the two-year moratorium on railway purchase bonds. Meanwhile business and civic leaders demand the withdrawal of the transportation system from politics and the setting up of the system as a separate governmental unit under a non-political commission.

✦

Hamilton, Ont.—The Hamilton Street Railway and the fleet of interurban buses has been offered to the city for $2,500,000 by the Dominion Power & Transmission Company. F. A. Gaby, chief engineer of the Ontario Hydro-Electric Commission, emphasized that the Hydro did not want either the street railway or the buses, but this may not represent the opinion of the full commission.

✦

Holyoke, Mass.—The Holyoke Street Railway proposes to install one-man service on local lines early in September. Veteran employees will be retained according to senority.

✦

Portland, Ore.—The operating department of the Pacific Northwest Public Service Company, has worked out a plan to indicate by colored cards whether a car is a "front" or "rear" entrance car. A bright chrome yellow dash sign on the front of the car indicates "front entrance," loading at the nearside crosswalk. If the dash sign is a rich azure blue in color, that means a "rear entrance" car, and should be boarded on the back platform.

✦

Walworth, Wis.—The Chicago, Harvard & Geneva Lake Railway has applied to the Interstate Commerce Commission for permission to abandon, and sell for dismantling its interurban line between Harvard, McHenry County, Ill., and Fontana, Walworth County, Wis. The company previously has had authorization from the state commission to abandon its passenger service in Illinois. The interurban line's right-of-way is paralleled by a concrete highway on which passenger bus and trucking service is available.

✦

Buffalo, N. Y.—Plans to effect improvements to the Falls View bridge across the Niagara gorge at Niagara Falls, ordered by the Canadian Board of Railway Commissioners are being studied by the engineering staff of the International Railway, owners and operators of the bridge. The commissioners recommend strengthening of the guard rail, the construction of an inner guard rail, the raising of the sidewalks 10 in. above the level of the vehicle section, and the use of a new type of floor construction at both ends of the bridge to prevent skidding when motor cars are halted for customs inspection.

Digitized by Google

Baltimore Introduces Its New Rolling Stock

First of Order of 150 Cars Placed in Service Under a Rehabilitation Program Following the Recent Favorable Fare Decision

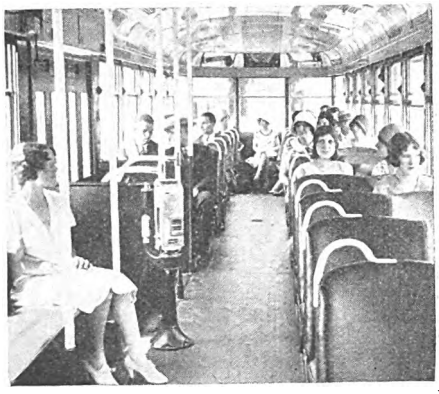
SERVICE with twelve new cars, the first of 150 to be received, was started on Sunday, Aug. 17, by the United Railways & Electric Company of Baltimore on its Madison Avenue line. Modern in their appearance, the cars symbolize the great improvement program instituted by the company, following the favorable fare decision made recently by the United States Supreme Court. The new cars are being delivered as rapidly as possible, and the company expects to have the entire 150 in operation by autumn.

While the cars are designed for one-man, two-man operation, the company started them out with two men, using the conductor as a helper to the operator. Taking a position at the front end of the car instead of at the middle, where the exit is, the conductor assisted the passengers in boarding, made change and instructed them in the use of the fare box. It will thus be possible, when the time comes to run the cars with one man, to do so with less confusion than if the company had started them out as two-man cars, operated on the pay-as-you-pass principle.

Although the weather was rainy and unpleasant most of the day, the line showed an increase in revenue over the corresponding Sunday for last year, when the weather was pleasant. Many favorable comments were made by those who rode on the cars, everyone being highly pleased with the new equipment. Coincident with the inauguration of the vehicles, an editorial, praising the efforts of the United Railways to increase its patronage by betterments, appeared in the Baltimore *Sun*.

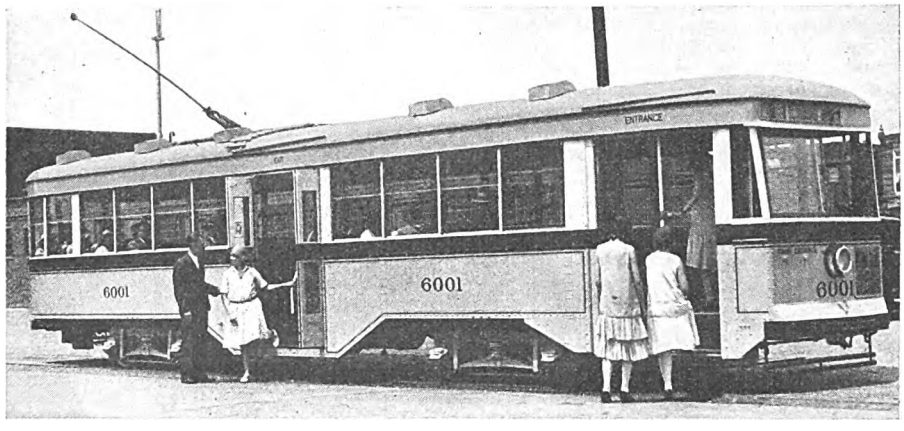
Effective publicity for the introduction of the cars was given in a special "New Car" edition of the company's publication, *Trolley News*. Printed in the form of a miniature newspaper and devoted entirely to the cars, the issue proved a valuable means of stimulating interest among the railway patrons. On the first page appeared a feature item, captioned "Better Transporation for Baltimore Is Promised as New Cars Come to Town," and a facsimile of a letter from the president of the Baltimore Association of Commerce, congratulating the company on the new cars and other service improvements. Individual articles contained in the issue described the use of metal, the low step and floor level, the use of stanchions and handholds in place of car straps, the improved heating and ventilation, the effective lighting system, and the mechanical devices assuring safety. The issue also included several illustrations and statistics regarding the new cars.

Of the 150 cars being built, 100 are being supplied by the J. G. Brill Company and 50 by the Cincinnati Car Corporation. Full details of these cars were given in a comprehensive article in the May, 1930, issue of ELECTRIC RAILWAY JOURNAL. The cars are of the double-truck, single-end, front-entrance, center-exit type, with an over-all length of 46 ft. All of the cars



Leather upholstered semi-bucket type seats, and dome lights add to the comfort and convenience of patrons

are being mounted on Brill 177-E-1 trucks with 26-in. rolled steel wheels. Each car will have four 50-hp. motors, either Westinghouse 516-A or General Electric GE-301. Automatic control of the PCM and VA type will be used, to obtain a smooth acceleration of 3.25 m.p.h.p.s. The total weight is 38,933 lb. and the seating capacity 52.



One hundred and fifty cars of this type are being received by the United Railways & Electric Company of Baltimore. The first twelve to arrive were placed in service on Aug. 17

Trailers Dropped on Lorain Avenue Line in Cleveland

An experiment designed to increase street car riding by giving faster and more frequent service has been started by the Cleveland Railway on the Lorain Avenue line, one of the longest in the city.

The principle is the same as that which has been in effect on the Madison Avenue route of the Chicago Surface Lines since July 19; namely, the substitution of single motor cars for trailers during the rush hours.

Under the new schedules of the Cleveland Railway, the headway is reduced from five to two minutes during the rush hours and the running time is cut from 47 minutes to 42 minutes. The base table running time has been reduced from 44 to 39 minutes and the night running time from 40 to 35 minutes.

The use of single-motor cars instead of trailers will increase operating costs, but it is expected the increase will be more than offset by the saving which will result from closing the Lorain Avenue carhouse.

Safety Congress to Meet in Pittsburgh

An interesting program has been provided for the Electric Railway Section of the National Safety Congress and Exposition, which is to meet in Pittsburgh from Sept. 29 to Oct. 3. The address of welcome will be made by Thomas Fitzgerald, vice-president and general manager Pittsburgh Railways. Other speakers will be Charles Gordon, managing director American Electric Railway Association, who takes as his subject, "Improved Public Relations a Result of Safe Operation," and C. H. Evenson, superintendent of transportation Chicago Surface Lines, whose subject is to be "Accident Prevention Through Supervisory Training." L. G. Tighe, assistant general manager Northern Ohio Power & Light Company, Akron, Ohio, will speak on "Experience of a Public Transportation Company in the Prevention of Street and Highway Accidents," and Chester K. Thomas, division superintendent Chicago, North Shore & Milwaukee Railroad, will discuss "How to Operate a Public Vehicle Safely."

Others who will participate include W. J. McCarter, of the personnel department, Cleveland Railway; E. K. Eastham, safety director St. Louis Public Service Company; Glenn Shaw, superintendent department of accident prevention, Northern Ohio Power & Light Company; Edward McCoy, superintendent employment-instruction Public Service Co-ordinated Transport; L. J. Troy, supervisor of safety Boston Elevated Railway; L. D. Voshall, superintendent of equipment Washington Railway & Electric Company, and John C. Baldwin, Pittsburgh Railways.

Digitized by Google

Engineers Organize to Seek Formula on Suitable Vehicle

An interesting program of activities for the coming association year was outlined at the first meeting of the new executive committee of the Engineering Association, held in New York Aug. 19. Of particular interest was the proposal, tentatively agreed upon after a lively discussion to appoint an independent committee, reporting to the executive committee, to study all factors which must be considered in determining the relative cost of operation of the three types of vehicles, the street car, the trolley bus, and the motor bus, and, if possible, to arrive at a formula which may be applied to select the proper type of vehicle. The personnel of the proposed committee would embrace engineers whose interests cover phases of practice which a problem of this nature involves.

Making convention programs more interesting was the subject of general discussion. Opinion was divided as to the necessity of presenting all committee reports on the convention floor, but it was conceded that if this is done they should be made as brief as possible. There was general agreement on the desirability of having at least one paper or address on a live subject at each meeting. The view was expressed that by outlining definitely to speakers the phases of a subject to be covered an added interest could be secured and a valuable discussion ensured.

Assignments for the coming year were agreed upon, and committee appointments will be sent out soon. A. W. Baker, engineering secretary, reported that the Manual will be ready for distribution in a few weeks. C. R. Harte presented the report of representatives on American Standards Association committees. This is to be published in summary form in the proceedings. Various routine matters were settled and adjournment taken, subject to the call of the president.

Members present at the meeting included President L. D. Bale, C. H. Jones, P. V. C. See, John Fleming, W. H. Wysor, C. R. Harte, E. M. T. Ryder, H. H. George, A. T. Clark and R. C. Cram.

Rerouting Suggested Under Indianapolis Traffic Survey

Proposals for rerouting of street cars in downtown Indianapolis to relieve traffic congestion are under consideration by the Citizens' Traffic Committee in connection with the redrafting of the city traffic code.

Members of the committee believe that the Indianapolis Street Railway can save money and operate more efficiently by establishing through service on the principal lines, thus eliminating numerous turns in the downtown section.

The committee recently announced plans to conduct a survey in co-operation with the Indianapolis Merchants' Association to determine the method of transportation used by shoppers. The count will be taken at a selected group of stores representative of all lines of business in all parts of the business district. Six-pointed question cards will be used, one being given to each customer as he enters the store. Each detachable point will carry a specific statement as to mode of travel in coming downtown. The one fitting the case will be torn off and deposited in a box. The points are: "Came by auto and parked at curb," "Came by auto and parked at parking lot or in garage," "Walked," "Came by trolley," "Came by bus," and "Came by train."

The count will cover an entire business day, from 9 a.m. to 5 p.m. The returns will be collected hourly and counted by hours and by types of businesses where collected.

Segregation Move in Portland, Ore

Paving a way for the Pacific Northwest Public Service Company, Portland, to separate its power and railway business into two operating subsidiary companies, the City Council has passed an ordinance permitting transfer of the existing franchises. The company expects immediately to proceed with plans for the formation of the Portland General Electric Company to take over the power and light franchises and physical property, and the Portland Traction Company to take over the railway.

Present plans involve an adjustment of the capital structures of the proposed companies requiring a vote of the stockholders and it is understood a special meeting of stockholders is to be called shortly.

Segregation is desired to facilitate compliance with the recent order of the Oregon Public Service Commission, and to facilitate negotiations with the City Council on any possible new railway franchises since the city has a "service-at-cost" franchise in preparation for the consideration of the voters probably in November.

Temporary Financing Proposed for Chicago "L"

The Chicago Rapid Transit has asked the Illinois Commerce Commission for permission to issue $6,872,000 of two-year 6 per cent notes at 96 to pay for the cost of construction work and improvements contemplated in the near future under the terms of the recent unification ordinance.

The principal expenditure will be for purchase of right-of-way for two additional tracks on Garfield Park Branch, Marshfield Avenue to Laramie Avenue, which will cost $2,009,000, and for addition of one track, Garfield Park Branch, Laramie to Marshfield Avenue, including realignment through Sacramento station, which will cost $2,517,000.

COMING MEETINGS

Sept. 5-6 — Central Electric Traffic Association, Wawasee, Ind.

Sept. 10-11 — Central Electric Railway Master Mechanics' Association, Miami Hotel, Dayton, Ohio.

Sept. 11-12—Maryland Utilities Association, leaving pier 19, Light Street wharf, Baltimore, Md., at 3 p.m., Sept. 11, for steamship cruise to Jamestown and Yorktown.

Sept. 17-19—Canadian Electric Railway Association, 26th annual convention, Ottawa, Canada.

Sept. 25 — Pennsylvania Street Railway Association, Casey Hotel, Scranton, Pa.

Oct. 9-11 — Midwest Electric Railway Association, Miami, Okla.

Oct. 22-24—National Transportation Meeting of the Society of Automotive Engineers, Pittsburgh, Pa.

Oct. 29-30—Iowa Electric Railway Association, Des Moines, Iowa.

Suburban Rapid Transit Fare Controversy in Cleveland

Discovery that a heretofore overlooked amendment to the Cleveland Union Terminal ordinance of 1919, giving the city the right to control rapid transit fares within a 15-mile radius of Cleveland, has laid the groundwork for a legal battle between the City Council and the Van Sweringen interests who control both the Cleveland Railway and rapid transit operations in the Cleveland territory.

Protests against the 15-cent rate charged by the Cleveland Interurban Railway on the Shaker Heights line led to the discovery that the Van Sweringen interests plan to charge the same fare on the projected East Cleveland rapid transit line, scheduled to go into operation in a few months, and a projected West Side rapid transit line along the Nickel Plate right-of-way, which it is proposed to put into operation next year.

The East Cleveland commission has voted to file a protest against the 15-cent rate of fare on the East Cleveland line, while attorneys for Shaker Heights residents have petitioned the Ohio Utilities Commission charging that legal steps were not complied with in raising the fare from 10 to 15 cents on the Shaker line.

The Cleveland law department called attention to the provision of the old terminal ordinance, under authority of which the Van Sweringen terminal was built, giving the city the right to fix the rapid transit fares within a 15-mile radius of the terminal and also specifying that the city should have the power to fix stops and that any rapid transit lines established under authority of the ordinance should have provisions for transfers between rapid transit and city cars. None of the rights granted under these provisions have ever been exercised. However, any attempt to enforce these provisions probably would lead to suit on the grounds that there is a conflict between the city ordinance and the utility regulations of the state.

Value of Winnipeg Railway Reported

The present value of the railway property of the Winnipeg Electric Company, Winnipeg, Man., is $17,024,658, according to an inventory and appraisal filed with the Municipal and Public Utility Board. To replace the property with new plant would cost $19,596,915. Distribution of value shows that the company's property has a new replacement cost of $18,259,395, but depreciation cuts this figure to $15,892,819. The report allows $1,770,500 for company's intangible assets as a "going value," because of its patronage and earning capacity. Among larger assets are listed 108 miles of single tangent track. The audit was filed in connection with the plans for an increase in fares and reductions in payments to the city.

Digitized by Google

Veteran prepared to guide visitors to Boston's Tercentenary

Helping Visitors to Boston

The Tercentenary Committee of the city of Boston and the Boston Elevated Railway on Aug. 18 opened an official booth to give visitors to Boston information on events relating to the tercentenary, and also general information relating to places of historical interest, near-by pleasure resorts, means of transportation and any other information that visitors want.

The booth is located adjacent to the memorial shaft and faces directly the main entrance to the South Station. It will be open from 10 a.m. to 6 p.m. on weekdays. Michael J. Dockery is in charge of the booth. He has been in the employ of the Boston Elevated Railway for 34 years, and for the last six years has been one of the information clerks at the Park Street subway station. The location for the booth was granted by the Boston Terminal Co.

New York's New Subway Nears Completion

Prospects point to the completion of construction work on the new Eighth Avenue subway line in New York City in time to permit the beginning of operation in the Fall of 1931. With the exception of three or four short stretches, the basic construction work has been finished from Chambers to 207th Street.

Mayor Walker and his transit advisors, it is known, regard the question of how the new line will be operated as of vital importance in the pending negotiations for unification of the new subway system with the B.-M. T. rapid transit lines. If the Eighth Avenue line is to be operated next year, it must be decided well in advance whether it will be part of a unified system or turned over to municipal operation, or leased to the B.-M. T. as an addition to the city-built lines operated by that company under Contract 4 with the city.

The most recent rumors are that a plan for operation of the new subway system at a 5-cent fare by a corporation whose shares are controlled by the city, obviating municipal operation or lease to existing traction companies, is being considered by city officials. This proposal is contingent on failure of negotiations to buy B.-M. T.

No Zone Fare Cabs in Cleveland

The Cleveland Railway, which opposed the projected invasion of Cleveland by a fleet of low-fare taxicabs and secured a temporary injunction restraining the city from granting the Zone Cab Company a license, has now won a partial victory.

The court has ruled that the cab company may be granted a license, but that it may not operate under its projected zone fare system. Instead, it must conform to the city ordinance and install meters which calculate the fares mechanically. The decision was handed down by Chief Justice Powell of common pleas court.

George D. McGwinn, vice-president of the Cleveland Railway, said:

"Judge Powell's decision prevents the operation of taxicabs on a zone basis. In obtaining this decision, I believe the company has done its full duty by its partner, the city of Cleveland, and by its stockholders."

Officials of the Zone Cab Company announced that meters would be installed and the cabs would go on the streets shortly.

Toledo Displays Its Wares

Transportation progress in Toledo was featured by the Community Traction Company, Toledo, Ohio, in its booth at the recent Toledo Industrial Progress Exposition. At the back of the display was an illuminated map of Toledo's co-ordinated railway and bus system flanked by a series of interesting pictures selling the idea of modern transportation.

Two motion picture machines were in constant operation One showed "The Story of Local Transportation" and the other action pictures in connection with operation and improvement of the railway. Model cars and buses were used to attract attention to modern equipment in use by the company.

Outside the exposition the company had special buses to connect with its main lines in the heart of the business and hotel district, giving an actual demonstration of service.

Effective display of facilities of Toledo Company for serving the public adequately

Digitized by Google

New Effort to Reach Equitable Philadelphia Value

A checking up and appraisal of the physical assets of the Philadelphia Rapid Transit Company and underliers has been ordered by the valuation committee of Judge McDevitt's General Transit Conference.

J. A. Emery, vice-president of Ford, Bacon & Davis, Inc., and a member of the valuation committee, will be in charge. He will receive the co-operation of Dr. Milo R. Maltbie, public utilities expert, who has been assisting Comptroller Hadley in his P. R. T. audit.

The purpose is to assist the valuation committee in determining a price to be paid by the city for the P. R. T. and the underliers, as recommended by the General Transit Conference.

The valuation committee was created to establish a "fair price" for the entire transit system. Members of the committee are: Judge McDevitt, chairman; Deputy City Comptroller S. Davis Wilson and Mr. Emery. Joseph Wayne, Jr., president of the Philadelphia National Bank, was named as the fourth member, but resigned because of the press of other business.

At the meeting at which decision to embark upon the appraisal was reached it was agreed that hearings will be resumed in mid-September in the city's equity suit against P. R. T. and the Mitten interests for alleged violations of the 1907 city-P. R. T. transit agreement.

Hearings in the city's suit were suspended in January to permit a survey of the transit situation by a conference of city officials and P. R. T. representatives in order to solve the tangled transit situation.

Upon organization the members of the conference which has come to be known as the General Transit Conference designated four experts to make a survey of the transit situation and to report a plan for its solution. Dr. Maltbie, representing Comptroller Hadley; Mr. Emery, representing Mayor Mackey; Solomon M. Swaab, acting for City Council, and W. K. Myers, vice-president of Mitten Management, Inc., for the transit interests, were the four selected. Their survey crystallized in a plan that the city purchase the entire transit system at a "fair price" as the only possible solution of the muddled transit situation.

They pointed out that at a price of $150,000,000 the city would save $7,319,365 annually in operating the transit system. A price of $200,000,000 would result in a saving of $4,644,635 annually, the experts reported.

Subsequently, Comptroller Hadley announced that he would not approve payment of a price in excess of $150,000,000, while sources close to the P. R. T. and underliers indicated that the minimum acceptable price would be $175,000,000.

It was at this point that the valuation committee was delegated to fix a "fair price" acceptable to both the city and the P. R. T. and underliers. In announcing the new check-up Judge McDevitt said:

We have concluded that we cannot reach a proper determination as to price until a check-up appraisal of the physical assets of the P. R. T. and underliers is completed.

The data to be gathered in such a check-up appraisal will supplement the facts already before the valuation committee. Once this new information is available we will then be in a position to make a report to the general transit conference.

It is our opinion that we will not be in a position properly to discharge our task until the most complete information as to every phase of the transit situation is accurately collated and digested.

In a matter of such vital importance every possible step should be taken to determine the value of the physical assets as well as the earning capacity, present and potential, of the transit system.

The cost of the work will be insignificant in comparison to its tremendous value and importance.

"Faster than We Build Them in New York"

The Chicago Board of Local Improvements has adopted a resolution ratifying the appointment of employees of the advisory subway commission and approving delayed payrolls for these employees. The recent opinion of Corporation Counsel Ettelson that the board should have a governing hand in subway construction was thus carried into effect.

Some authorities in Chicago are holding that substantial improvement in transportation will come before a subway is available. In this connection Alonzo J. Hammond, a prominent engineer, has proposed a plan whereby the capacity of the present "L" structure in the Loop can be doubled by utilizing the Loop structure differently.

When asked whether Chicago's new subway would be ready for the World's Fair in 1933, Robert Ridway, chief consulting engineer, said: "That's faster than we build them in New York."

Seattle Municipal Having Its Troubles

(*Continued from page* 597)

tracks, paying all but $153,000 of this amount out of the city's general budget. He also favors a straight city bond issue of $1,500,000 to provide funds to "buy fast, modern street cars, upholstered and comfortable to ride in."

Another problem is the one of pensions. To settle this matter voters may be asked to decide whether the civil service pension system, now applying to all employed outside the police and fire departments, shall be abandoned so far as the railway is concerned, or whether the railway department's present contribution to the fund shall be assumed by the city taxpayers.

The railway, light and water departments are now matching their employees' contribution to the pension system out of their utility earnings. In view of the railway department's present financial embarrassment, it probably will not be able to continue its pension contributions out of earnings with the extra burden, also, of the 44-hour week and the 4-cent-per-hour increase in wages granted to the railway employees a year ago. The railway's pension requirements for 1931 will amount to $150,000, while the 44-hour week is costing about $45,000 a year and the 4-cent increase about $80,000 a year, all to come out of current earnings even now inadequate.

Conspectus of Indexes for August, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares* 1913 = 4.84	Aug., 1930 **7.99**	July, 1930 **7.97**	Aug., 1929 **7.76**	Aug., 1930 **7.99**	Aug., 1925 **7.28**
Electric Railway Materials* 1913 = 100	Aug., 1930 **134.2**	July, 1930 **136.2**	Aug., 1929 **146.4**	Dec., 1926 **159.2**	Aug., 1930 **134.2**
Electric Railway Wages* 1913 = 100	Aug., 1930 **231.8**	July, 1930 **231.7**	Aug., 1929 **231.0**	Aug., 1930 **231.8**	Aug., 1925 **222.6**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	Aug., 1930 **195.9**	July, 1930 **197.7**	Aug., 1929 **200.8**	Nov., 1928 **205.7**	Aug., 1930 **195.9**
General Construction Cost Eng'g News-Record 1913 = 100	Aug., 1930 **201.0**	July, 1930 **201.0**	Aug., 1929 **205.9**	Jan., 1927 **211.5**	July, 1930 **201.0**
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	July, 1930 **84.0**	June, 1930 **86.8**	July, 1929 **98.0**	Nov., 1925 **104.5**	July, 1930 **84.0**
Wholesale Commodities Bradstreet 1913 = 9.21	Aug., 1930 **10.45**	July, 1930 **10.56**	Aug., 1929 **12.63**	Dec., 1925 **14.41**	Aug., 1930 **10.45**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	July, 1930 **144.0**	June, 1930 **147.9**	July, 1929 **158.5**	Nov., 1925 **167.1**	July, 1930 **144.0**
Cost of Living Nat. Ind. Conf. Bd. 1914 = 100	July, 1930 **152.4**	June, 1930 **154.8**	July, 1929 **161.6**	Nov., 1925 **171.8**	July, 1930 **152.4**
Industrial Activity Elec. World, kw.-hr. used 1923-25 = 100	July, 1930 **105.1**	June, 1930 **115.5**	July, 1929 **129.2**	Feb., 1929 **140.4**	Aug., 1925 **94.3**
Bank Clearings Outside N. Y. City 1926 = 100	July, 1930 **91.6**	June, 1930 **92.1**	July, 1929 **107.8**	Oct., 1929 **111.8**	July, 1930 **91.6**
Business Failures Number	July, 1930 1930	June, 1930 1874	July, 1929 1570	June, 1930 1874	Sept., 1928 1348
Liabilities, Millions of Dollars	**72.21**	**114.40**	**104.70**	**114.40**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average rice of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Digitized by Google

City Begins to Realize on Its Rapid Transit Investment

New York City's entire bonded investment in the Interborough Rapid Transit system, totaling more than $163,000,000, is on a self-supporting basis for the first time since the signing of the dual subway contracts in 1913. The immediate result will be to reduce by at least $5,500,000 the debt-service item in the city's budget for the coming year.

Under the 1913 contract with the Interborough, by which the city contracted to build the lower west side line, the upper east side line and the Brooklyn extensions, the city issued bonds totaling $104,000,000 for its share of construction work. The city was to receive a return of 8.76 per cent on its investment, after the Interborough had deducted enough to cover its rental of $2,600,000 a year for the old subways, its interest on bonds, operating expenses and a preferential of $6,335,000 a year.

For years after the entire system was in operation deficits in the Interborough's preferential, which comes ahead of the city's return, prevented the receipt by the city of any sum at all on its investment. As a result the city had a frozen credit of $104,000,000 in the system, with $5,250,000 going into the budget each year to pay the carrying charges on the bonds, plus an even larger amount to carry the $166,000,000 the city invested in the B.-M.T. system, where a similar financial situation has prevailed.

BOOK REVIEWS

Co-ordinated Transportation

"Co-ordinated Motor - Rail - Steamship Transportation." By G. Lloyd Wilson, Ph.D., Professor of Commerce and Transportation, Wharton School of Finance and Commerce, University of Pennsylvania. D. Appleton & Company, New York. 228 pp., illustrated. Price $3.50.

The thesis presented and supported in this book is that the interest of the shipper, carrier and public are best served if each transportation agency is used in the service to which it is especially adapted and for which it is most efficient and economically equipped. Significance of co-ordinated transportation is described in detail in the first chapter and attention is called to the fact that all transportation agencies have a common interest. This, however, does not necessarily have to be identical. Having discussed the transportation facilities, the author also looks at the terminal problems because here all transportation begins and ends and much of the efficiency and speed of haulage depends upon the management and equipment of the terminal, whether for passenger or freight purposes. Terminal arrangements in New York, Chicago, Boston, St. Louis and Cincinnati, are adequately described, and terminal systems in England and Canada are discussed also. Important problems such as store-door freight service and co-ordinated motor-rail passenger service are treated adequately, while the various layouts of system are illustrated to give the reader a better understanding of the different phases of co-ordinated transportation discussed.

High-Voltage Oil Circuit Breakers

By Roy Wilkins, consulting engineer Pacific Electric Manufacturing Company, and E. A. Creilin, assistant engineer, division of hydroelectric and transmission engineering, Pacific Gas & Electric Company. Published by the McGraw-Hill Book Company, Inc., New York, N. Y. 296 pages, 121 illustrations, price $4.

This volume brings together all the major facts concerning the characteristics and advantages of the principal types of oil circuit breakers.

The authors have set forth in their book a chronological account of the development of the high-voltage oil circuit breaker, a discussion of the theory of its action, descriptions of modern forms and an account of the results of many field tests.

Descriptions of the modern high-voltage oil circuit breakers are given in considerable detail. Recent developments in operating mechanisms designed to meet the demands for greater speed and better control are presented and discussed. Field tests of performance of a number of different breakers are presented and reviewed. The tests made with relatively high charging current are particularly interesting, since such conditions can be obtained only in the field. The authors have treated their subject largely from the standpoint of the user, but the viewpoint of the manufacturer has not been overlooked.

Problems in Public Utility Management

By Philip Cabot, professor of public utility management, and Deane W. Malott, assistant professor of public utility management, Graduate School of Business Administration, Harvard University. Published by the McGraw-Hill Book Company, Inc., 628 pages. Price, $6.

The book consists of a varied selection of cases prepared under the supervision of the department of public utility management, of the Graduate School of Business Administration, Harvard University, from printed reports of court and commission decisions and from information supplied to the authors by the officers of public utility companies. These problems have been selected and prepared primarily for teaching purposes. Nevertheless, public utility officials and their lawyers will find the treatment of the problems by the case method of great interest and value.

The book consists of four divisions, each with an introduction by the authors, setting forth the principles supported in the cases. The readings of the treatment is as follows:

I. Characteristics of a Public Utility.
II. Valuation, Depreciation and Fair Return.
III. Marketing.
IV. Finance.

The authors have assumed the belief that the most urgent engineering problems of public utility management have been solved and that the major task during the next generation will be that of marketing the products of the utility companies. For this reason, they have placed emphasis on the economic rather than on the engineering or administrative side, in demonstrating the complexity of the marketing problems and how the difficulties of public utility rate-making are further complicated by the regulation of prices by state commissions.

Public Utility Control in Massachusetts

By Irston R. Barnes, Yale University. Yale University Press. 1930. 239 pages. Price $3.

Professor Barnes gives the results of an investigation of the practical application of the doctrine of prudent investment theory to the problems of rate regulation. Massachusetts was selected for the study, and the book gives the first compilation of the laws and all the reports of the state. The chapters deal with: the development of regulatory machinery in Massachusetts; statutory control over security issues; statutory control over rates; rate regulation under the federal rule, the investment theory, and the Massachusetts policy; critical appraisal of public utility regulation in Massachusetts.

A Traffic Control Plan for Kansas City

"An Outline of Principles and Practical Methods for Traffic Control of Value to all American Cities." By the Albert Erskine Bureau, Harvard University, Miller McClintock, Director, Civic Department, Chamber of Commerce, Kansas City, Mo. 272 pages, 57 illustrations and charts and 24 tables. Price, $5.

The report shows how the standards and recommendations developed by the National Conference on Street and Highway Safety may be adapted for use in a city with average traffic problems. The report has been prepared with a view, not only of developing a constructive plan of traffic control for Kansas City, but also of presenting principles of traffic relief valuable in any city where problems of street congestion and traffic hazards exist. Numerous graphs and charts are used to portray the findings of the survey. Many of these charts are of an entirely different nature from those used in any similar report previously issued.

Mr. McClintock regards the report as one of the best and, in many ways, the most interesting report on street traffic planning which the Erskine Bureau has yet prepared. While it was compiled primarily for the relief of local street traffic problems, it should be of value to public officials and others interested in traffic conditions in any city. The bureau tried to a greater extent than ever before to use the pictorial or graphic method in presenting essential facts and conclusions. This accounts for the large number of plates included. These should make the work of particular value in other cities, as they reveal in a simple manner the technique which was used. Moreover the book contains a number of new studies never before undertaken in connection with street traffic planning. Among these the exhaustive analysis of retail store sales in relation to various types of transportation patronage should be of special interest.

Digitized by Google

PERSONAL MENTION

Personnel of Successor Company in Indiana Announced

Henry Bucher, L. M. Brown and J. A. Greenland All Elevated to Important Posts with Indiana Railroad, Now Operating Former Lines of Union Traction

ROBERT M. FEUSTEL, executive vice-president of the Midland United Company and president of the newly organized subsidiary Indiana Railroad, which has assumed control of the properties of the Union Traction Company of Indiana, has announced the appointment of the following officials of the Indiana Railroad and other interurban electric railway lines under the same co-ordinated management:

Henry Bucher, who is manager of the railway department of the Indiana Service Corporation, Interstate Public Service Company and co-ordinated companies, will be vice-president and general manager of the new company in charge of operations.

W. A. Sauer, vice-president, will have general supervision of accounting and financial matters. Walter Shroyer will direct the accounting work, reporting to E. J. Booth, comptroller.

L. B. Andrus, power executive of the Midland United Company, will have charge of the operation of all power stations, substations and transmission lines. F. L. Ray, superintendent of power plants, and J. O. Peniston, superintendent power distribution, will report to Mr. Andrus.

L. M. Brown, general manager of the Interstate Public Service Company railway department, will be general superintendent of interurban lines of the Indiana Railroad as well as the Interstate Public Service Company, Indiana Service Corporation, and Northern Indiana Power Company. C. C. Lentz, superintendent of transportation, will report to Mr. Brown.

J. A. Greenland, who has been superintendent of transportation of the Indiana Service Corporation at Fort Wayne, will be general superintendent of city lines in charge of local operations of the Indiana Railroad at Anderson, Marion and Muncie; of the Indiana Service Corporation at Fort Wayne, Wabash, Peru and Logansport; of the Interstate Public Service Company at Coumbus, Jeffersonville and New Albany, and of the Northern Indiana Power Company at Kokomo.

W. L. Snodgrass, superintendent of traffic of the Indiana Service Corporation, will be general superintendent of traffic of the Indiana Railroad and co-ordinated systems. C. D. Hardin, traffic manager of the Interstate Public Service Company, and F. D. Norveil, general passenger and freight agent of the former Union Traction Company, will report to Mr. Snodgrass.

H. V. Norford, formerly superintendent of maintenance of way of the Indiana Service Corporation, Fort Wayne, will be general superintendent of maintenance of way of the Indiana Railroad and co-ordinated lines. L. A. Mitchell, engineer of maintenance of way, will report to Mr. Norford.

Henry Bucher

Heber LaMonte will be superintendent of motive power of the joint properties, reporting to Mr. Bucher.

E. E. Slick, claim adjuster of the former Union Traction Company, will continue in that capacity, also reporting to Mr. Bucher.

HEADQUARTERS IN INDIANAPOLIS

Operating headquarters of the Indiana Railroad and other lines under the same management will be located in the Traction Terminal Building in Indianapolis. Only the auditing department and division operating staff of the Indiana Railroad will remain in Anderson, Ind., where general offices of the Union Traction Company formerly were located.

With the transfer of the properties of the Union Traction system to the Midland United Company, Harry A. Nicholl, general manager of the Union Traction for 25 years, and C. S. Keever, superintendent of transportation for the past ten years, resigned.

L. M. Brown

J. E. Cullen in Special Baltimore Post

John E. Cullen, who was with the United Railways & Electric Company, Baltimore, Md., from 1918 to 1922, has been appointed technical adviser to the company. Mr. Cullen does not become a member of the company, but will devote a part of his time to the work. President Storrs explained that because of Mr. Cullen's intimate knowledge of conditions in Baltimore and his experience in the utility field be can be of great help on many subjects.

Mr. Cullen has spent many years in the newspaper field, beginning his career in Baltimore. He became managing editor of the *Evening Sun* and later was advertising and business manager of the *New York Mail*. After leaving the United Railways & Electric Company in 1922 he joined the Hearst organization and took charge of the concern's publications in various cities. On two occasions he was publisher of the Hearst newspapers in Baltimore. He also was a member of the general management staff of the Hearst organization.

Several months ago Mr. Cullen entered the investment brokerage business at the head of Cullen & Company, Baltimore.

✦

J. F. Gardiner Publicity Manager for Byllesby

J. F. Gardiner has been appointed advertising and publicity manager of H. M. Byllesby & Company, Chicago.

T. P. Pfeiffer has been appointed advertising manager of the Byllesby Engineering & Management Corporation and Standard Gas & Electric Company.

J. W. Hicks has been appointed publicity director of the Byllesby Engineering & Management Corporation and Standard Gas & Electric Company, also remaining in charge of the publications of these companies issued for executives and employees.

✦

Mr. Mahaffie With I.C.C. Eight Years

Charles Delahunt Mahaffie, ap[pointed by President Hoover to fill the v[acancy on the Interstate Commerce C[ommission caused by the resignation of Co[mmissioner Thomas F. Woodlock, has beer[connected with the commission since 1922 [chiefly as director of the bureau of finance

Mr. Mahaffie was born in Ol[he, Kan., in 1884. He received an A.B. d[gree from Kingfisher College in Oklahon[in 1905, and was a Rhodes scholar from [Oklahoma at Oxford University, England, [rom 1905 to 1908. From 1908 to 1909, [was instructor of jurisprudence at [Princeton University, and later practiced [in both Oklahoma and Oregon. He [tered the government service in 1916 as [licitor of the Department of the Interior [and from 1921 until he joined the com[ission he was an attorney for the United [tes Railroad Administration.

Commissioner Thomas F. Wo[lock, Mr. Mahaffie's predecessor, was a[pointed to the commission by President [olidge in 1925. He was serving his [st term, which would have expired on [c. 31 of this year.

Digitized by Google

A. R. Hanbury New Assistant Engineer Way and Structures

Arthur R. Hanbury has succeeded H. W. Smith as assistant engineer of the way and structures department of the Kansas City Public Service Company. He has been a member of that organization since May, 1927, when he went to Kansas City as an engineering representative of the William G. Woolfolk Company, for which he inspected and supervised the roadway rehabilitation then in progress. Upon its completion in March, 1928, he was made assistant to John V. McKinney, the executive vice-president of the company.

Prior to becoming a member of the Kansas City railway organization, Mr. Hanbury was associated with various engineering enterprises. During the World War he served with the expeditionary forces in France, being attached to the

A. R. Hanbury

engineer unit, and when peace was declared he had attained a grade of master engineer in the Rainbow Division.

In July, 1919, he became associated with the Southern Pacific Railway as assistant engineer in survey work in California. When this work was successfully finished in 1921 he entered the service of the Illinois Central Railroad as an assistant engineer. This position he relinquished to engage in railroad location work for the Soviet Government in Russia.

Upon his return from Russia Mr. Hanbury became connected with the William G. Woolfolk Company, Chicago. He proved himself so valuable in his work for this company that at the completion of the rehabilitation of the railway he was transferred to the Kansas City Public Service Company as assistant to the executive vice-president.

Arthur R. Hanbury was born in Chicago on June 13, 1897. He was educated in the grade schools of Chicago and was graduated from the Carl Schurz High School of that city. Later he attended Lewis Institute, also of Chicago.

✦

New Officials in Spokane

Frank T. Post was elected president, J. E. E. Royer, general manager, and R. B. Childs, assistant general manager, respectively, of the Washington Water Power Company, Spokane, which controls the Spokane United Railways, at a meeting of the members of the board of the trustees held Aug. 4 in New York.

Mr. Post has been chief counsel of the Washington Water Power Company since 1909, and a vice-president since 1926. He succeeds as president D. L. Huntington, who died last September. Mr. Royer entered the employ of the company in 1907 and became assistant general manager on Nov. 1, 1924. He succeeds the late Miles W. Birkett. Mr. Childs has been a commercial engineer with the company since 1923 and previous to that was in the employ of the Montana Power Company. He was a captain in the 363rd infantry of the 91st division in the World War.

L. W. Chubb to Direct Westinghouse Research

L. W. Chubb, former manager of the radio engineering department of the Westinghouse Electric & Manufacturing Company, has returned to the company as director of the Westinghouse Research Laboratories. For some months past Mr. Chubb had been located in Camden, W. Va., as assistant to the vice-president of the Radio Victor Company. Mr. Chubb is filling the position left vacant by the promotion of S. M. Kintner to assistant vice-president.

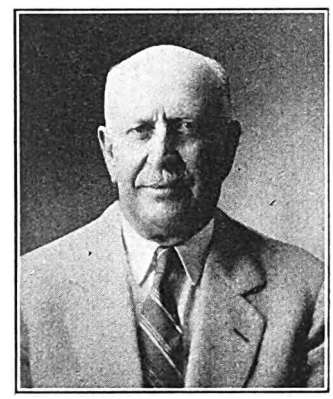
H. A. Nicholl Resigns from Indiana Union Traction

WITH the resignation on Aug. 1 of Harry A. Nicholl, general manager of the Union Traction Company of Indiana for the past 25 years, one of the most prominent and experienced figures in the electric railway industry retired. Extensive and varied business interests require his attention in Indianapolis and Anderson, and Mr. Nicholl does not expect to re-enter the electric railway field for the present. He will continue to reside in Anderson with his wife and family of two daughters. His only son, Thomas H. Nicholl, recently was made superintendent of shops of the Cleveland Railway, Cleveland, Ohio.

The measure of Mr. Nicholl's contribution to the thought of the industry is reflected not only in his work for the Union Traction Company but by his activities in association affairs. He has participated in the work of the American Electric Railway and Central Electric Railway Associations, and in the Central Electric Traffic Association almost since its inception. He was second president of the C.E.T.A., and in 1915 was chairman of the transportation and traffic committee of the C.E.R.A. Since that time he has served in various executive capacities with all three associations, having been chairman of the executive, pick-up and delivery, finance and constitution and by-laws committees of the C.E.R.A. and a member of the rules, insurance and other committees of the A.E.R.A.

Mr. Nicholl has devoted more than 40 years of his life to every phase of the steam and electric railway business. Following in the path of his father, who was a civil engineer with the Illinois Central Railroad, Mr. Nicholl began his career in the late '80's as a transitman for the Chicago & Northwestern Railroad at Chicago. During the next few years he successively held the positions of yard clerk, baggage-master, freight and passenger agent with the Northwestern system and the Illinois Central Railroad, and finally as assistant general freight agent of the Natchez, Columbus & Eastern Railway, a subsidiary of the Illinois Central in the South.

In 1895 Mr. Nicholl withdrew from the steam railway field to become vice-president and general manager of the North Chattanooga Street Railway and Chattanooga & Northside Railway at Chattanooga, Tenn. Three years later he became connected with a financial syndicate



H. A. Nicholl

controlling the Rochester (N. Y.) Railways (now the New York State Railways) as purchasing agent and superintendent of motive power. While occupying these positions he also had charge of construction of the Rochester & Sodus Bay Railway, connecting Rochester with summer resorts on Lake Ontario.

In 1900 he was made manager of the Taunton Street Railway, Taunton, Mass., but the following year he went to Ithaca, N. Y., as general manager and treasurer of the Ithaca Street Railway. After serving in this capacity for two years, Mr. Nicholl joined the Cleveland & Southwestern Railway as general manager. In 1905 he left this company to go to Anderson, Ind., as general manager of the Indiana Union Traction Company, succeeding A. L. Drum, now president of the Eastern Michigan Railways. He was simultaneously named president of the Traction Light & Power Company, a subsidiary serving 50 small communities located along the railway lines and adjacent to them.

At the time Mr. Nicholl entered its employ, the Indiana Union Traction was only two years old, having been incorporated in 1903 as a consolidation of the Indianapolis Northern Traction Company extending from Indianapolis to Peru and other small lines connecting Marion, Muncie, Anderson and Indianapolis. The company was reorganized in 1912 as the Union Traction Company of Indiana, but by purchase and construction was subsequently increased to a system with more than 450

Digitized by Google

miles of track, making it at that time one of the largest interurban electric railway systems in the world.

For many years the railroad enjoyed a profitable business, but under the pressure of paved roads and mounting automobile competition, its revenues began falling off in 1921, and in 1924 Arthur W. Brady, its former president, was appointed receiver. Extensive improvements were effected during the receivership, including the purchase of new all-steel passenger coaches and parlor-buffet cars, but operating deficits continued to grow, until on July 2 of this year the road was sold at public auction to the Midland United Company, Chicago, which controls the Interstate Public Service Company, Indiana Service Corporation and other electric railways serving central and southern Indiana. When the receivership was dissolved and the property was deeded to its new owners, Mr. Nicholl resigned his position as general manager.

Mr. Nicholl was born in 1862.

✦

S. Johnson, Jr., Bendix-Westinghouse Chief Engineer

S. Johnson, Jr., has been appointed chief engineer of the newly formed Bendix-Westinghouse Automotive Air Brake Company at Pittsburgh. In assuming his new responsibilities, Mr. Johnson has, as a background, many years of service and a broad experience in automotive circles.

Last July Mr. Johnson went to Pittsburgh as general engineer for the automotive division of the Westinghouse Air Brake Company. Previous to this time he had served successively in the capacity of inspector, mechanical expert, assistant district engineer, and service engineer over a period of six years, during which time he was identified with the Chicago office of the automotive brake division.

Mr. Johnson is a recognized authority on air brake equipment as applied to modern automotive transportation and is widely known by those closely associated with the industry. He was graduated from the University of Michigan with the degree of mechanical engineer.

✦

J. Franklin Pond Made Manager at Petersburg

J. Franklin Pond, for many years superintendent of the Petersburg division of the Virginia Electric & Power Company system, has been promoted to manager of the Petersburg and Hopewell division of the company. Mr. Pond joined the company in July, 1903, as time keeper on construction work. Since that time he has worked his way up through the various branches of both the transportation and the light and power departments.

Simultaneously with his own promotion, Mr. Pond has announced the following changes in the staff of the Petersburg and Hopewell division:

C. L. Longanecker, who joined the organization in December, 1925, as distribution engineer, has been made superintendent of the electric department.

J. J. Duell, who entered the service in 1903, leaves his position as railway and bus dispatcher to become superintendent of the transportation department.

R. M. Bush, who joined the organization as a draftsman, and who has been assistant distribution engineer since June, 1929, has been promoted to distribution engineer.

T. R. Langan

T. R. Langan Promoted by Westinghouse Company

C. E. Stephens, vice-president, Westinghouse Electric & Manufacturing Company, announced, on Aug. 10, the appointment of T. R. Langan as assistant northeastern district manager of the Westinghouse organization.

Mr. Langan has been with the Westinghouse company for more than twenty years. Starting as an apprentice in the engineering department, he advanced through the construction, service and sales departments of the company to the office of manager of the transportation division of the Northeastern District which office he held at the time of his promotion. He has been identified with the major high-voltage alternating-current railroad electrifications in the United States, and when the New York, New Haven & Hartford Railroad system was electrified, Mr. Langan acted in a supervisory capacity on this installation for three years.

Before going to the New York office, Mr. Langan served the Westinghouse company in Philadelphia, Baltimore, Buffalo and was manager of the Syracuse office.

Mr. Langan will make his headquarters at New York. He will continue to function as manager of the transportation division of the northeastern district.

✦

Well-Known Engineer With Fairmont Railway Motors

H. W. Protzeller has been appointed engineer of maintenance of equipment of the Fairmont Railway Motors, Inc., Fairmont, Minn., makers of section motor cars and an extensive line of other railway supplies. He has long been connected with electric railway work, specializing in railway maintenance equipment and labor-saving devices for handling railway roadbed problems. In the past ten years he has been granted 42 patents on equipment of this kind.

H. W. Protzeller

Mr. Protzeller was graduated from Lehigh University, specializing in electrical and mechanical engineering. This training he supplemented by taking the graduate test course of the General Electric Company. With the General Electric Company he spent several years in the construction department installing railway equipment. He served as assistant superintendent of the Twin City Rapid Transit Company at Minneapolis for three years, and as general superintendent of transportation of the St. Mary's Traction Company at Sault Ste. Marie, Mich., and Ontario.

Following two years at Sault Ste. Marie, he served another two years as consulting engineer for electric railways in Minnesota, Michigan, and Illinois. He assisted in organizing and helped to build the Minnesota Northwestern Electric Railway, and operated that property as general manager for eight years. More recently he has acted as development engineer of the O. F. Jordan Company, East Chicago, Ind. His service with that company covered a period of six years.

✦

John F. McCabe Relinquishes His Springfield-Worcester Duties

John F. McCabe, purchasing agent for the Springfield and the Worcester Consolidated Street Railways, has completed his service for the companies, with the discontinuance of the companies' purchasing departments and the combining of their functions with those of the New York, New Haven & Hartford Railroad in New Haven. His assistant, James E. Meehan, is being transferred to the purchasing offices in New Haven.

Mr. McCabe had been in electric railway work for nearly 40 years. He started as clerk in the storekeeper's department of the West End Street Railway in Boston in 1891. From there he was transferred to the auditor's office and later to the president's office. From 1893 to 1901 he was in charge of the department of tracks, accounts and division correspondence.

On leaving the company at Boston he became chief clerk to R. T. Laffan, general superintendent of the Worcester Consolidated Street Railway, and in 1920 he was given the title of purchasing agent. Later the purchasing activities of the Worcester and the Springfield companies were concentrated in Springfield.

✦

P. S. Arkwright Heads N.E.L.A. Policy Committee

P. S. Arkwright, president of the Georgia Power Company, Atlanta, Ga., has been reappointed chairman of the public policy committee of the National Electric Light Association. Mr. Arkwright first was appointed to the chairmanship of this committee by M. S. Sloan, former president. As chairman of the public policy group, Mr. Arkwright has an important part in the affairs of the association. During the past year, the task of the committee was exceptionally difficult, and Mr. Arkwright's reappointment is regarded as a distinct honor. Mr. Arkwright was formerly president of the association.

Digitized by Google

W. B. Spencer in New Post at Providence, R. I.

William B. Spencer, director of public relations for the United Electric Railways, Providence, R. I., is also to fill the newly created post of traffic manager. Mr. Spencer will have full charge of the operation of the transportation department.

G. B. Merchant, paymaster, and R. H. Matthews, tax agent, have been retired on pension by order of the board of directors. Both have served the company many years.

The office of general superintendent of transportation is abolished and the incumbent, J. A. Lockhart, has been made assistant claim agent. He will continue as head of the operating staff.

R. W. Hayward, formerly associated with the claim department, is appointed safety manager.

A department of research is created, and H. S. Thorsen, supervisor of schedules, is made a member of the new department.

Mr. Spencer has been prominently identified with many local civic projects, having served as president of the two largest civic clubs in Providence. He is also well known locally as a public speaker. He has a long record of service with the United Electric Railways, having entered the service of its predecessor, the Rhode Island Company, on Aug. 7, 1907, as office boy in the accounting department.

After that he was successively night clerk at one of the carhouses, clerk in the main office of the transportation department (working as both motorman and conductor in his spare time, to round out his street railway experience). In 1913 he was appointed chief clerk in the transportation department. The same year, he was also placed in charge of publicity and public relations, as assistant to the president, but in 1928 was appointed executive

W. B. Spencer

assistant to the vice-president and general manager carrying responsibility for publicity, public relations, safety and other matters.

To help fit himself for his successive promotions Mr. Spencer supplemented his early schooling by attending business college and by taking extension courses at Brown University, so directing his studies along cultural and practical lines as to stand him in good stead in his work with the railway.

From office boy in 1907 to executive in 1930 at the age of 37 and in a period of 23 years is Mr. Spencer's record, the more remarkable because of the wide range of his work and the exacting nature of many phases of it.

✦

Thomas H. Nicholl Now In Important Cleveland Post

Thomas H. Nicholl, who succeeds Terance Scullin as superintendent of buildings and equipment of the Cleveland Railway, Cleveland, Ohio, joined the research department of the company at Cleveland in 1929. Before that he had been superintendent of motive power of the Union Traction Company of Indiana.

From September, 1914 to 1916, Mr. Nicholl was engaged as light and power solicitor with the Traction Light & Power Company, Anderson, Ind. In May, 1917, during the World War, he entered the First Army Officers Training Camp at Fort Benjamin Harrison. Upon completion of this training course he received a commission as Captain of the Tenth United States Infantry, where he served through the duration of the war.

Mr. Nicholl's first position upon leaving the army was with Ball Brothers, Muncie. He next was employed as manager of the Komo Chemical Company, Kokomo, where he remained until his resignation in August, 1922, to accept a posititon as acting superintendent of motive power with the Union Traction Company of Indiana, in which capacity he continued until he joined the railway in Cleveland. During the past year or two Mr. Nicholl has been active in the Central Electric Master

T. H. Nicholl

Mechanics Association, being its first president. Subsequently he served as chairman of the standardization committee and as a member of the handbook committee of that organization.

Mr. Nicholl was born at Baltimore, Md., on Dec. 11, 1893. He was educated at the University of Michigan.

OBITUARY

W. N. Ryerson

William Newton Ryerson, president of the Trojan Engineering Corporation, New York, and a director of the People's Light & Power Corporation, New York, died recently. Mr. Ryerson was born in New York City, Dec. 7, 1874. Following his graduation from the Columbia School of Mines, he entered the employ of the Sprague Electric Elevator Company, Bloomfield, N. J., serving on electrical testing and drafting from November, 1896, to January, 1898. In the same year, 1898, he worked as draftsman for the Western Electric Company, New York, and as assistant to the chief engineer of the Waldorf Astoria Hotel.

In October, 1898, he became associated with the Metropolitan Street Railway, New York, on construction and power work and substation operation, but resigned from the company in June, 1901, to go with the Manhattan Railway as chief operator of its steam electric generating station. His chief interest at that time was electric railways and subways. In October, 1901, he became superintendent of the substations for the Interborough Rapid Transit. In 1905 he was made assistant superintendent of construction for the Niagara Construction Company, and later in the same year, superintendent of construction for the Ontario Power Company, Niagara Falls, Ont., a position he held until January, 1909.

It was then that he became general manager and chief engineer, and also a director of the Great Northern Power Company, Duluth, Minn. He was in this position more than thirteen years. About the time the Duluth properties were acquired by the Electric Bond & Share Company, Mr. Ryerson left to form a connection with Day & Zimmermann of Philadelphia, as assistant manager of the public utility management department, where he supervised the details of operation of all the utility properties, budgets, new business, rates, public relations, accounting and major construction progress.

In January, 1925, the United Gas Improvement Company of Philadelphia, made him assistant to vice president, in charge of operations and engineering. When the Trojan Engineering Corporation was organized in September, 1928, Mr. Ryerson became its president, which position he held at the time of his death.

✦

H. R. Wair

Harry R. Wair, vice-president and general counsel for the Northern Indiana Railway, Inc., South Bend, Ind., died July 11. Mr. Wair had been legal counsel for the street railway and interurban properties in and about South Bend for 35 years.

Upon the reorganization of the street railway property to the Northern Indiana Railway, Inc., his long years of service and outstanding activity in the building up of street railway service in South Bend brought him the appointment as vice-president of the new company.

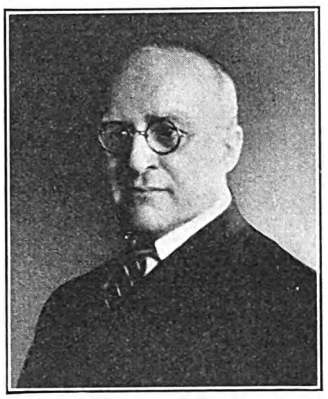
Mr. Wair was born in September, 1871. In addition to his activity in the railway, he was one of the most prominent attorneys in South Bend, being counsel for many of the large corporations in Northern Indiana.

Digitized by Google

James Carey Davis

James Carey Davis, advisory operating vice-president of the American Steel Foundries, Chicago, Ill., died at Mackinac Island on Aug. 10, aged 65 years.

For seventeen years Mr. Davis was associated with the Sargent company. In 1896 he became general superintendent of operations, in which position he remained until 1901 when he accepted a similar position with the Leighton & Howard Steel Company, St. Louis. He remained in this capacity until both companies were absorbed in 1902 by the American Steel Foundries. He then became western district manager and in June, 1905, was transferred to the Chicago office as assistant to the first vice-president in charge of



J. C. Davis

operations. In 1912 he was elected fourth vice-president of the company, in charge of foundry operations, and continued to occupy that position until March 21, 1929, when he was elected advisory operating vice-president.

Scott H. Blewett

Scott H. Blewett, general agent in St. Louis for the American Car & Foundry Company, died on July 24 following a long illness. Mr. Blewett joined the company as a general agent 35 years ago. Prior to that he was principal of two public schools in St. Louis. He was born at Georgetown, Ky., on Nov. 28, 1851, and was graduated from Colby University, Waterville, Me. For four years after leaving college, he was connected with a publishing concern in Cincinnati. He went to St. Louis in 1874. In 1880 he left the public school system there to become general superintendent of the Scruggs-Vandervoort-Barney Dry Goods Company with which he continued until he joined the American Car & Foundry Company in 1894.

✦

Thomas H. Rowland, one of the organizers of the company which constructed the first street railway line—a steam tramway—to reach from Kansas City, Mo., into the newly platted suburban districts of Kansas City, Kan., died in Santa Ana, Cal., recently.

✦

Dimmitt Elwood South, manager of the office of the Georgetown, Portsmouth & Cincinnati Traction Company at Bethel, Ohio, and former employee of the United States Treasury, is dead.

INDUSTRY MARKET AND TRADE NEWS

Delivery of New York Subway Cars Begins

Ten of an order of 300 new cars for New York's new subway system were delivered in the first week in August to the 207th Street yards, where motors and electrical equipment will be installed. More than 1,000 workmen are engaged in filling the city's $9,000,000 order at the Berwick, Pa., shops of the American Car & Foundry Company, and deliveries will be made from time to time as the units are completed.

Painted an olive green and bearing the name "City of New York" along the side, the new cars embody in their design several original features of construction. Four pairs of double doors on each side, with each opening 3 ft. 10 in. wide, allow entrance and exit in eight lanes, and are expected to facilitate the interchange of passengers at station stops. Quick dispatch will be further expedited by an improved door mechanism, which will prevent the holding of cars by delayed passengers. If the door, in closing, strikes any object, it halts, but does not completely reopen as do the doors on the I.R.T. trains. When the object is removed the door closes. The new cars have no vestibules.

New Cars a Substantial Improvement Over Present Models

Fully equipped, with motors, the new cars cost approximately $38,000 apiece. Each car is a complete unit and none of the trailer variety are being purchased by the city. Cars are 60 ft., 6 in. long, 9 ft. 2 in. longer than the I.R.T. cars and about 7 ft. shorter than the single steel cars used by the B.-M.T. The triplex B.-M.T. cars are 137 ft. long. I.R.T. cars cost approximately $26,000 and triplex B.-M. T. cars in the neighborhood of $75,000.

The new cars will seat 60 passengers and have a total capacity of 280. This compares with a capacity of about 600 in the B.-M.T. triplex units, and is more than the comfortable capacity of the I.R.T. cars. Station platforms on the new city subway have been designed to accommodate trains of eleven cars, longer than either the B.-M.T. or I.R.T. trains.

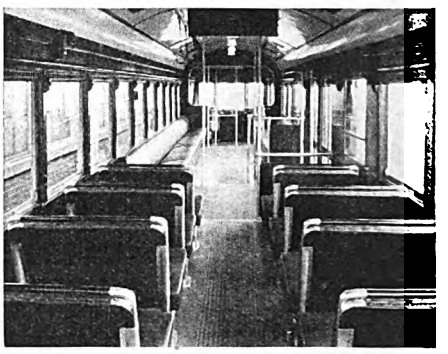
Maximum speed of the cars is between 45 and 50 m.p.h. Automatic, quick release, electro pneumatic brakes should stop them within 500 ft. when operating at 40 m.p.h.

All cars are equipped with multiple-unit door control, with only three men needed to operate a train—a motorman, a conductor and a rear guard.

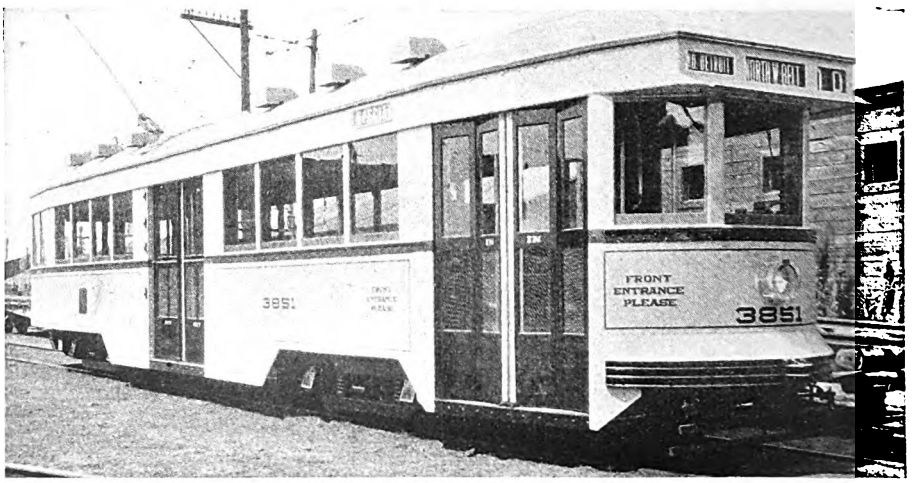
New Street Cars Arrive in Detroit

The first of an order of 130 street cars, ordered earlier in the year from the St. Louis Car Company for the City of Detroit Department of Street Railways, was delivered in that city on Aug. 11. The remaining cars are to be shipped at the rate of six each week until the order is completed.

Costing approximately $13,500 each, the new cars are of the single-end, double-truck, front-entrance, center-exit type, arranged for two-man operation and seating 52 passengers. Orders for motor and control equipment were divided equally between the Westinghouse and General Electric companies.



In addition to leather upholstered seats, ample standing capacity is provided in new Detroit cars



General view of new Detroit cars, showing arrangement of entrance and exit doors

Digitized by Google

Oklahoma Railway Awaits New Cars

Delivery is soon to be made by the St. Louis Car Company of ten one-man, single-end, double-truck passenger cars which were ordered last April by the Oklahoma Railway for service in Oklahoma City. The new cars will be of all-steel construction, with arch roofs, and will weigh approximately 25,000 lb. Length over all will be 37 ft. 5 in.; length over body posts, 27 ft. 2 in., and over-all width 8 ft. 4 in. Motors and air brake equipment are to be supplied by Westinghouse, and trucks are of the St. Louis Car Company Type GR-54.

Other specifications are as follows:

Armature bearings	Plain
Car signal system	Faraday high voltage
Compressors	Westinghouse D.H.-16
Conduit	Flexible
Control	Westinghouse K-35
Curtain fixtures	National Lock Washer Co.
Curtain material	Pantasote
Door mechanism	National Pneumatic
Doors	Folding
Fare boxes	Johnson
Finish	Duco
Hand brakes	St. Louis Car Company-Harmon type
Heaters	Consolidated
Headlights	Golden Glow SM-95
Interior trim	Mahogany
Journal bearings	Plain
Journal boxes	St. Louis 4 7/16 x 4 in.
Lamp fixtures	Westinghouse
Roof material	Wood, canvas covered
Sash fixtures	Adams & Westlake
Seats	St. Louis
Seat spacing	29 in.
Seating material	Rattan
Slack adjusters	St. Louis
Steps	Folding
Step treads	St. Louis
Trolley catchers	Ohio Brass
Trolley base	Westinghouse
Trolley wheels	Westinghouse
Wheels	Steel, 26 in. diameter
Wheelguards	St. Louis

New Cars for Edmonton Property

Edmonton Radial Railway, Edmonton, Alta., has placed an order with the Ottawa Car Manufacturing Company for five double-truck steel motor cars, equipped with safety features, for one-man operation in city service. General dimensions of the new cars are: length over all, 46 ft.; length over body posts, 30 ft.; height, rail to top of roof, 10 ft. 6 in.; width over sheathing, 8 ft. 3 in. Total weight will be approximately 38,675 lb., made up as follows: car body, 19,000 lb.; air brake equipment, 2,200 lb.; electrical equipment, 7,400 lb.; trucks, 10,075 lb. Seating capacity will be 51 passengers.

The roof is to be of plain arch type, with steel carlines. Cars will be equipped with double folding doors at the front, and a treadle-operated exit door near the center. The forward door of the pair at the front will be for entrance, and the other will be for exit purposes. The front doors will be operated by folding door engines. Haskelite will be used for interior finish, such as curtain boards, waist paneling and bulkhead lining.

Electrical equipment will include four GE-247-J, 40-hp. motors. Canadian General Electric Company is to supply air brake equipment and safety car control equipment with selective valve and treadle for center doors. Trucks will be of Canadian Car & Foundry Company's design, with 5-ft. 4-in. wheelbase, and with cast-steel bolsters and patented spring-tension, drop-forged, case-hardened link bolster guides. Axles will be A.E.R.E.A. standard forged steel type, with 4-in. diameter motor bearings, Journal bearings will be of the roller type, and the wheels, of rolled steel, will be 26 in. in diameter.

Other specifications are as follows:

Car signal system	Faraday
Curtain fixtures	National Lock Washer Co.
Curtain material	Pantasote
Destination signs	Keystone
Fare boxes	Cleveland No. 5
Hand brakes	Peacock staffless
Headlights	Ohio Brass Company
Headlining	5/16 in. Agasote
Interior trim	Birch
Painting scheme	Red, cream trim
Roof material	Wood, canvas covered
Seating material	Leather
Step treads	Honeycomb
Trolley catchers	Earll No. 10
Ventilators	Nichols-Lintern
Wheelguards	H-B life guards
Special devices	Nichols-Lintern air sand hoppers

Dodge Brings Out New Models

Two new body designs, each of 21-passenger capacity in a new 172-in. wheelbase chassis, as well as changes in power plants of existing models have been announced for production by Dodge Brothers. The new chassis is of the conventional type, powered with an eight-cylinder 3½x5-in. engine of 384.84-cu.in. displacement, which develops maximum of 120 hp. at a speed of 300 r.p.m.

Body designs are radical in appearance in that the fronts have been designed to produce less wind resistance. At the same time the driver is moved up alongside of the engine so that 20 in. of body seating area has been released for widening out seat centers and to give more comfortable wheelhouse seats.

A single body shell is designed to be used for either parlor car or city service. In the latter service, doors are of the double jacknife type, folding inward, with a rear exit door cut in behind the rear axle on the right-hand side. Both of these doors are operated by vacuum engines under the control of the driver by a four-position lever control valve. The first position opens the front service door, the second position is neutral, while the third position opens the rear exit door. Thus the rear door opens last and must be closed prior to operation of the front service door.

As for weights, the chassis tips the scales at 7,500 lb. The parlor car, ready for service with full complement of gasoline, spare tires, etc., weighs 12,000 lb., while the city service vehicle weighs 500 lb. less, or 11,500 lb. Equivalent weight on a per seat basis for the parlor car is 572 lb. and for the city bus, 547 lb.

Recent Bus Deliveries to Electric Railways

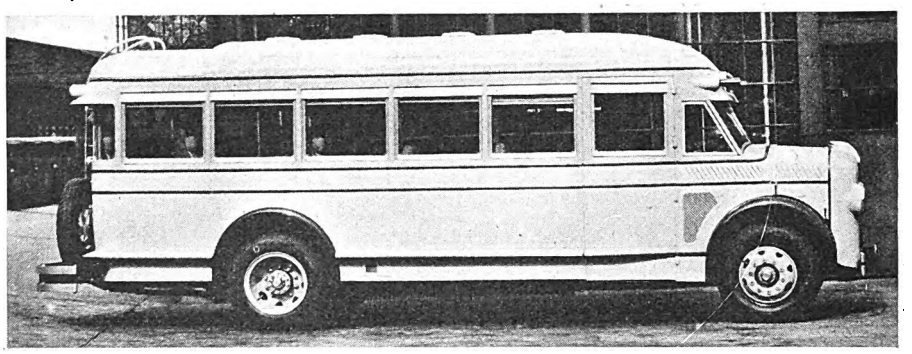
The General Motors Truck Company announces the delivery of 30 Yellow Coaches to electric railways, divided as follows: Twelve double-deck gas-electric coaches to the Baltimore Coach Company; twelve Type Z 38-passenger city service coaches to New Orleans Public Service, New Orleans; ten additional Type Z 29-passenger city service coaches to the Connecticut Company, New Haven; two additional Type Z 29-passenger city service coaches to the Delaware Bus Company, Wilmington, Del.; and two each of the Type U 21-passenger city service coaches were delivered to the Mississippi Valley Electric Company, Iowa City, Ia., and to the Beaver Valley Motor Coach Company, Pittsburgh.

The Eastern Massachusetts Street Railway has accepted within the past month six A.C.F. buses of the 40-passenger all-steel Metropolitan type, and five White Model 65A buses. Other A.C.F. deliveries include thirteen 40-passenger all-steel Metropolitan coaches to the United Electric Railway of Providence, R. I., and two 23-passenger street car coaches to the Triple Cities Traction Company, Binghamton, N. Y.

The White Company reports 21 bus deliveries for the month of July, among which were one White Model 54 and one White Model 54A to the Boston, Worcester & New York Street Railway, Framingham, Mass.; two White Model 65 to the Wisconsin Public Service Corporation, Green Bay, Wis.; one White Model 54A to the Brooklyn Bus Corporation, Brooklyn, N. Y.; three White Model 65A to the Evansville Suburban & Newburgh Railway, Evansville, Ind.; and eight White Model 65 to the Aronomink Transportation Company, Upper Darby, Pa.

Twin Coach Corporation also reports for the month of July one trolley bus to the Brooklyn & Queens Transit System, Brooklyn, N. Y.; three urban buses to the Milwaukee Electric Railway & Light Company; eight urban buses to the Aronomink Transportation Company, Upper Darby, Pa.; and two urbans to the United Electric Railways, Providence.

Deliveries by the Mack International Motor Truck Corporation of recent date consist of one Model BC, 29-passenger city-type bus to the Holyoke Street Railway, Holyoke, Mass.; one Model BC and one Model AB city-type bus to the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.



Reduced wind resistance and increased comfort of wheelhouse seats feature radical body designs incorporated in new bus models

Digitized by Google

Electric Railway Material Prices—September, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	10.75
Lead, cents per lb.	5.00
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	4.35
Tin, Straits, cents per lb.	30.00
Aluminum, 98 to 99 per cent, cents per lb.	23.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	37.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.15
Somerset mine run, f.o.b. mines, net ton	1.75
Pittsburgh mine run, Pittsburgh, net ton	1.40
Franklin, Ill., screenings, f.o.b. mines	1.50
Central, Ill., screenings, f.o.b. mines	1.15
Kansas screenings, Kansas City	1.75

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ⅝ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.075
Angles bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.70
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.40

Hardware—Pittsburgh

Wire nails, base per keg	$2.10
Sheet iron (24 gage), cents per lb.	2.45
Sheet iron, galvanized (24 gage), cents per lb.	3.05
Galvanized barbed wire, cents per lb.	2.80
Galvanized wire, ordinary, cents per lb.	2.80

Waste—New York

Waste, wool, cents per lb.	12.00 to 15.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	9.00 to 13.00
Colored	5.00 to 7.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	13.3
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	0.48
Putty, 100 lb. tins, cents per lb.	5.725

Wire—New York

Copper wire, cents per lb.	12.75
Rubber-covered wire, No. 14, per 1,000 ft.	$5.05
Weatherproof wire base, cents per lb.	4.89

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.50
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¼-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	8.75
Light copper, cents per lb.	7.75
Heavy yellow brass, cents per lb.	5.75
Zinc, old scrap, cents per lb.	2.25
Lead, cents per lb. (heavy)	4.25
Steel car axles, Chicago, net ton	$15.25
Cast iron car wheels, Chicago, gross ton	13.75
Rails (short), Chicago, gross ton	14.00
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	6.25

American Turnstiles for Argentine Subway

Perey Manufacturing Company has received an order for more than one hundred Perey Coinpassers and a number of Perey Standard Passimeters for installation in the stations of the new Lacroze subway in Buenos Aires, Argentina. The system of collection will be similar to that used on the B.-M.T. subways in New York. The fare to be charged is ten centavos and the coinpassers are being made to receive a coin of this denomination. The instruments are to be provided with bulls-eye illuminated coin detectors to prevent the deposit of slugs and counterfeit coins.

Brill Company Reports Orders

The J. G. Brill Company announces that it has recently received orders for three double-end, double-truck cars, to be equipped with Brill 84-E trucks, from York Railways, York, Pa. Eighteen double-end, double-truck cars, to be provided with Brill 177-E type trucks, have been ordered by Empresas Electricas Associadas, of Lima, Peru. The Brill Company will also supply eight 40-passenger trolley buses for the Chicago Surface Lines.

Equipment Ordered for Reading Railroad's Substations

Another step in the $20,000,000 electrification program of Reading is reflected in an order to the Westinghouse company for supervisory control and switchboard equipment for seven power substations and fourteen intermediate stations to supply current to the electrified zone. There will be a total of 24 controlled stations in the present electrification project.

Power will be received from the 60-cycle commercial lines of Philadelphia Electric Company, at the Wayne Junction converter station, and distributed at 25 cycles to substations as required for operation of trains. The electrical energy will be under immediate supervision of chief power dispatcher at Wayne Junction, and any rearrangement of the power feed, necessitated by failure or repair to lines, may be made without interruption of service.

Ohmer Directors Meet

At the meeting of the board of directors of the Ohmer Fare Register Company, Robert C. Lee of the Guardian Trust Company, Cleveland, was elected a director to fill a vacancy on the board. Other directors are John F. Ohmer, H. B. Ohmer, John P. Breen, John S. McIntire and H. W. Baker, of Dayton; Freeman C. Allen of Rochester, N. Y.; F. J. Lisman of New York City and John F. Ohmer of Los Angeles.

During the meeting at the company's offices, several new machines that will shortly be announced to the public, were inspected and plans approved for their distribution.

Copper Lowest in Twenty Years

With sales of copper in considerable quantity at 10.75 cents during the past few weeks, this commodity has attained its lowest price in the current market, as well as the lowest level in more than twenty years. The decline started shortly after the first of the year, when the price was cut 4 cents a pound from the 18-cent level, where it had been pegged for several months. In spite of efforts on the part of producers to maintain the price at a higher level, there has been a steady decline to the present low figure. Heavy stocks of the metal on hand and a decreased demand on the part of certain interests, which have been large consumers, have contributed to lower the price. A sharp curtailment of output is now forecast, with a probable gradual upswing in the quotation.

Production to Start by General Car & Coach Company

O. F. Warhus, president of the General Car & Coach Corporation, has announced that production of the company's standardized street car and trolley bus will start on a schedule of 100 cars a year at the factory established in Rensselaer, a suburb of Albany, the plant representing an investment of $175,000. It is intended to start manufacture within a few weeks, and within three months it is expected that 150 men will be at work. This number will be increased to 200 when production begins to hit the stride now planned.

The type of car proposed for manufacture will be similar to Car No. 301 of the United Traction Company, Albany, to be built under patents held by Mr. Warhus. The vehicle will weigh 12 tons.

The site acquired by the new company for its plant was formerly owned by the Eastern New York Utility Company. It includes a carhouse, freight shed, power plant, machine shop, garage and offices and contains approximately 45,000 sq.ft. of floor space. The property covers 5 acres in the heart of lower Rensselaer.

Mr. Warhus is a native of Davenport, Iowa. He has had twenty years of experience in the field of electric transportation. He was vice-president and general manager of the Versare Corporation and later vice-president and director of the Cincinnati Car Company, where he was in charge of engineering and sales.

T. M. van der Stempel, formerly of the staff of ELECTRIC RAILWAY JOURNAL, and a graduate mechanical-electrical engineer, will be in charge of sales. He has had experience both here and abroad in electric railway and highway transportation engineering problems.

✦

Firestone Tire & Rubber Company, Akron, Ohio, has prepared figures showing the sharp decline in tire-mile costs over a period of years, indicating the engineering and manufacturing progress made in this field. According to the company's reckoning the average tire-mile cost of its product for 1930 is approximately one-fifteenth of the cost in 1910.

✦

White Motor Company, through its directors, at a meeting held on Aug. 1, reported net earnings for the first six months of the current year of $1,048,000, as compared with earnings of $1,404,000 for the same period last year. Sales during the period exceeded $21,000,000, which is approximately 90 per cent of the peak period of last year. The showing is regarded as particularly gratifying in view of general business conditions. Through a readjustment of working schedules and rearrangement of hours, the company has maintained its full working force in the production department of the business, and there have been no reductions in the wage rates of any of the workers.

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., Editor

Volume 74 | New York, October, 1930 | Number 11

Conditions Favorable Now for Modernization

TO UNDERTAKE extensive plant improvement at a time like the present, when business conditions are considerably below normal, might at first appear to be the application of a counsel of perfection, but actually there are excellent reasons for so doing. The general feeling existing among business men that expenditures of all kinds should be curtailed until conditions improve, appears to be founded upon vague apprehension rather than definite facts. In many respects the immediate future presents an unusually promising opportunity for modernizing equipment and machinery.

For some time past the barometer of business has stood without much change at about 85 per cent of normal. This closely approximates the minimum figure recorded during the 1921 depression. Past experience indicates that stiff resistance begins to be felt at about this point, and it appears improbable that any further serious decline will now occur, although a definite upward movement may not set in immediately.

PRICES are now the lowest in years. Economists who have studied the matter state that they are not likely to go lower. On account of its feeling of apprehension, business has not been borrowing extensively and idle money has been accumulating. This has resulted in the creation of a favorable credit situation which makes the forward buying of raw materials at this time a thoroughly sound policy. There are signs that shrewd management in many lines has already begun to buy. Stocks of commodities and raw materials have been allowed to run extremely low. If buying becomes general the situation may change with the suddenness of the bursting of an ice jam and a lively scramble for materials may ensue.

Not only is the present a favorable time for buying ordinary materials and supplies, but it is also a particularly opportune time to undertake modernization of plant and equipment. This is no less true for the electric railways than for other industries. The future undoubtedly will make exacting demands upon the transportation companies as to quantity and quality of service. Any idea that standards of living will be permanently lower and that former automobile users will be compelled to patronize the public transportation service is likely to prove an illusion. The history of business depressions in the past shows that standards of living are not permanently affected. Electric railways cannot afford to postpone improving their equipment in the hope that the public will remain satisfied with what they now have. The railways must continue to improve their product to keep pace with public demand.

ANOTHER factor of supreme importance is the economic advantage of modernization of plant and equipment. It has been demonstrated again and again that new rolling stock can be made to pay for itself out of the larger earnings and the operating savings. This is equally true of other improvements. Shop costs can be substantially lowered by the introduction of up-to-date machinery. Track and line maintenance costs can be reduced through modernization.

Under existing conditions the financing of improvements should not present any very serious problems. The electric railways have been less affected than any other industries by the present business depression. Credit is comparatively easy. The bankers will scarcely remain deaf when it appears that the work to be carried out will be quickly paid for by the resultant savings. A dollar spent today for modernization will buy substantially more that it has for some time past, and more than it is likely to do in the future.

Digitized by Google

Timidity a Bar to Progress in Car Design

EXPERIMENTAL designs of cars incorporating radical innovations have been comparatively numerous during the past few years. These developments have been received by the industry with lively interest. But only in a few instances have railways actually bought such cars and tried them out on an extended scale. When purchases have been made it has been customary to order cars designed very much along traditional lines.

In defense of this policy it is contended that the new developments have not yet been proved out in service and that their adoption on a large scale would involve grave risks. There is some truth in this contention, but it should be remembered that there is also a certain amount of risk in not buying equipment of the latest design. New cars bought today but built along the same general lines as the cars of a decade ago, may be rendered obsolete almost at the outset if the latest designs prove successful.

The fear that equipment of new design will not stand up in service has been exaggerated beyond all reason in the electric railway industry. No such apprehension exists in other fields. When Henry Ford brought out his new model automobile a few years ago, prospective purchasers did not question its practicability and continue to buy the old Model T. They bought the new machines as fast as the factory could produce them.

The latest types of electric railway equipment are the outgrowth of painstaking scientific study. That they will give faultless service is too much to expect. On the other hand, there is no reason to anticipate that they will prove less satisfactory than the older types. In fact, there is every reason to expect that they will prove more satisfactory. So long as the railways refuse to adopt these new designs and cling tenaciously to the designs of a decade or more ago, they must expect to have their equipment appear obsolete.

Neglect of Precautions Against Fire May Prove Costly

INDUSTRY pays the cost of fire insurance. From that fundamental principle there is no escape. This means that a favorable record maintained over a period of years will make possible lower rates; conversely, a succession of disastrous losses will just as surely produce higher rates.

As a result of the improved record of the electric railways of the country for some years past, the insurance committee of the American Electric Railway Association, through co-operation with representatives of the stock fire insurance companies, was able in 1929 to secure a substantial reduction in the cost of insurance to the industry, resulting in an aggregate saving of many thousands of dollars in insurance premiums. Within the past year, however, there has been a change in the trend. Carhouse fires resulting in losses in excess of a million and a quarter dollars have been reported.

Investigation into the causes of some of these recent fires would suggest that adequate precautions have not been taken. In one instance, where a large loss was sustained, there was a delay of fifteen minutes between the discovery of the blaze and the turning in of the alarm. The employee who discovered the fire ran past one alarm box, the location of which should have been familiar to him, to another box located a quarter of a mile away. The presence of dry grass in car storage yards has been responsible for a number of dangerous blazes. Certainly this would appear to be an inexcusable neglect of ordinary precautions. On one particular property more than 40 fires occurred in the switch groups of cars in service. Lax inspection seems to be the only possible explanation of this situation.

If, in a spirit of economy, there had been a tendency to reduce expenditures for fire prevention below a safe margin, it is much to be regretted. In the long run it will certainly prove to be very poor economy. While the routine of fire prevention is not a particularly inspiring job for those who carry out its details, it is a most important one. If it is neglected, the entire industry will pay heavily.

Investment by Compulsion

UNREASONABLE in the extreme is the attitude of some municipal authorities in requiring the electric railways to make non-productive investments. An excellent example of this is furnished by the experience of an electric railway company which owned a combination railway-highway toll bridge. In response to a widespread popular demand that this be made a free bridge, the company presented it without charge to the municipality, stipulating only that its cars should always have free use of the bridge. But the number of automobiles using this bridge increased rapidly, and the municipality soon decided that the old bridge should be replaced by a larger and more pretentious structure. This was done at no inconsiderable expense and the railway was presented with a bill for something more than $100,000 as its share of the cost of building a bridge which served its purposes no better than the bridge which it had once owned and given away.

Not altogether unlike this, is the situation in another city where it is proposed to create an impressive plaza adjacent to a handsome new steam railroad passenger station. Numerous street changes are contemplated in this project. Near by is a power house owned by the local electric railway, and under the streets are many cables running to outlying substations. Relocation of conduits and cables will probably cost nearly $100,000. Does the city expect to pay the cost of this phase of its civic improvement program? Certainly not—the brunt of the cost is to be borne by the company, which is perfectly satisfied with the present location of its conduits and cables.

Another similar instance is found in a plan for extending the municipal park system in a certain city, involving the relocation of street railway tracks at an estimated cost of about $500,000 to the company. In return for this the railway gets exactly nothing—no more passengers, no more revenue, no reduction in operating expense.

Now, it so happens that in the cities where these companies operate there is great hue and cry about the high cost of street railway service. Officials of the local government are loud in their assertions that the companies' figures of capital invested are far too high—that these investments do not truly represent property "used and useful in the public service." These officials are ardent advocates of the prudent investment theory of valuation. But they are strangely silent about the prudence of a railway making an investment of $100,000 in a new bridge for private autos, or a similar sum in

Digitized by Google

new cables and conduit to permit the creation of an impressive plaza at the gateway to the city, or $500,000 in track changes necessitated by the extension of the municipal park system. Such expenditures, into which the railways are forced without hope of ever getting back one single penny in return, would be severely criticized if they were done voluntarily. Because they are done under compulsion does not make the expenditure any more justifiable. It merely shifts the blame to the municipal authorities.

Seattle's Ever-Present Problem

TURMOIL and trouble have been the lot of the city of Seattle ever since it took over the railway lines of the Puget Sound Power & Light Company shortly after the war. The prediction was made at the time that difficulties would ensue, but there was no stopping the politicians then in the saddle. They have now passed into oblivion, but what a heritage they have left to their successors! At Seattle mayors have come and mayors have gone, as have councilmen, too, while the Seattle Municipal Railway has proceeded from bad to worse, physically and financially. In the post-war period, the privately owned railway systems have certainly had their troubles, but no patient on the sick list suffering from complications incident to recent economic changes is nearer financial death than the Seattle Municipal Railway.

Ole Hanson, Seattle's Mayor who put the city into the railway business, is merely a memory. But municipal ownership in that city is more than a memory. It is a very unpleasant reality. To review all the details is not necessary. Although a moratorium on the principal of the debt has been arranged for a period of two years to give the municipal railway a breathing spell, the situation is so bad that resort has again been had to warrants payable in the future to provide cash to meet the current interest charges. In effect, Seattle has been robbing Peter to pay Paul. The city has at times borrowed from the light fund to meet railway obligations. It has been constantly living out of capital. It has gone from one unhappy expedient to another. Each has failed except as a temporary measure. Even the grandiose plan went askew involving the marketing of $10,000,000 of general city obligation bonds, $9,000,000 to be applied to the liquidation of original purchase price and the rest to go for improvements. The present mayor was right in saying that "a straight out-and-out railway bond issue would not be attractive to investors under present conditions in Seattle." Thus, as one commentator has said, Seattle's experiment in running its railway seems to be entering its last disastrous phase.

Of course, high-grade managerial talent might help the situation, but men of real capacity are few and far between who would risk their reputations under the system that endures in Seattle. What is the answer? Seattle got nowhere on a 5-cent fare. It has got nowhere on a 10-cent cash fare with three tickets for 25 cents. The existing situation presents an economic problem of the first magnitude. As such it must be solved. Politics has not found the answer in the past fifteen years. Will the committee of citizens now charged with the work of planning a remedy have the gumption to suggest the one answer that might contain a ray of hope —to divorce the operation of the system from politics? That would be a strange anomaly—municipalization without politics.

Dropping the Trailer

CONSIDERED to be an economical means of increasing passenger carrying capacity on heavy traffic routes, the operation of multiple-unit and trailer trains enjoyed marked popularity during the first half of the past decade. As congestion on the streets became worse and peak loads became heavier, more and more trailers were pressed into service. Almost every large city railway used trailers, some on an extensive scale. But conditions have changed during the past few years, and a number of companies are reverting to single car operation. The move made recently by the Chicago Surface Lines in abandoning all of its trailer operation is particularly significant. Shortly after this came news that the Cleveland Railway, another large user of trailers, was suspending their operation on the Lorain Avenue line to study the results with single units.

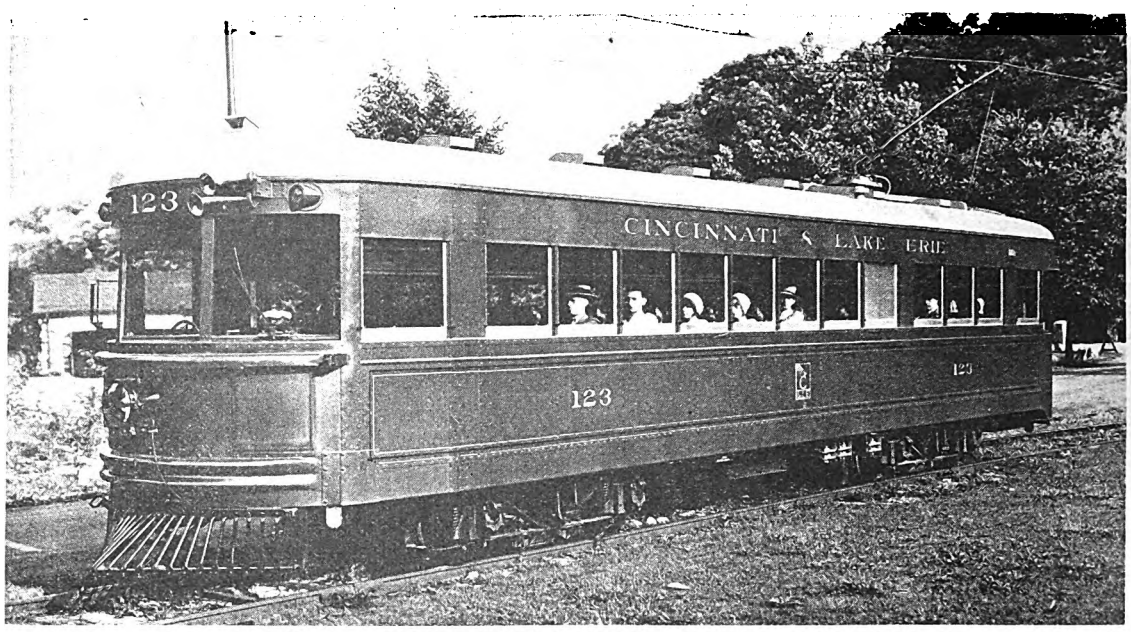
In both cities the trailers were dropped so that more frequent service could be given and faster schedules maintained. Since speed and frequency are important factors in encouraging the public to patronize street cars, the companies feel that this move should result in increased riding. Use of single units may actually decrease the cost of operation, and if riding is stimulated the additional gross income and net income may be quite pleasing.

Speaking generally, trains operated in city service have been of three types: (1) motor car and unmotorized trailer; (2) motor car, and trailer with motors but without control; (3) multiple-unit cars. In most cities the practice has been to operate the motor car as a single unit in the slack hours and pick up the trailer for the rush. This has the advantage of increased rush-hour carrying capacity without a corresponding increase in platform labor. On the other hand, picking up and dropping trailers is a cumbersome job unless special facilities are provided. Moreover, to haul a trailer at the desired speed, the motor car must be equipped with large capacity motors making it overpowered for operation as a single unit.

Permanently coupled trains have been used to some extent, and recently a considerable number of articulated units have been placed in service. But operation of these large units throughout the day can be justified only on lines where riding is exceptionally heavy. A serious disadvantage of all types of train operation is that it is ordinarily slower than single-car operation because of the greater number of stops which each unit must make.

Weighing the cost of operation against the resulting patronage is the only way to determine which type of service is the most satisfactory. Analyses of this kind seem to indicate that on some properties train operation is more satisfactory than single units. On other properties it appears that single units are the better choice. In Chicago, the frequency of service was doubled and the running time reduced 12 per cent on Madison Street when trailer operation was abandoned. These are important improvements, and their effect in making the service attractive deserves serious consideration. Similar improvements are anticipated as a result of the change in Cleveland. Whether or not the theory on which these companies are working has a wider application is difficult to foretell. Certainly, the comparative results of single units and trailer operation in both Chicago and Cleveland will be observed with keen interest by the entire electric railway industry.

Digitized by Google



One of the new cars. Note the low height, tapered ends and curved roof specially designed for high speed operation

Cincinnati & Lake Erie's

NEW DE LUXE CARS

Challenge the Steam

WHAT is perhaps the most interesting and significant experiment of recent years in the development of interurban passenger traffic appears to be a pronounced success. This experiment, which has been tried on the lines of the Cincinnati & Lake Erie Railroad in Ohio, seems to point the way for the upbuilding of the passenger business of many interurban properties whose physical characteristics are such that sustained high speeds can safely and comfortably be made.

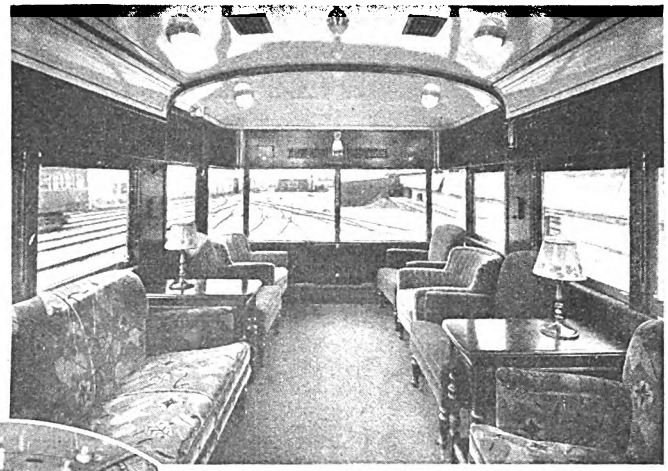
Early in 1929 the management of this interurban, under the leadership of its president, Dr. Thomas Conway, Jr., began a series of experiments designed to point the way to the evolution of an interurban car much faster and more comfortable than any which had theretofore been built. To this end the company adapted some of its low-level trucks to permit of unusually high speed and mounted them under car bodies generally similar in appearance and size to those which the management had in mind. These experiments were conducted in conjunction with the Westinghouse Electric & Manufacturing Company, the General Electric Company, the J. G. Brill Company, the Cincinnati Car Corporation, and the Westinghouse Traction Brake Company. Many valuable lessons were learned; many baffling problems were encountered and, one by one, they were solved. Specifications embodying these developments were thus gradually built up under the active supervision and direction of W. L. Butler, executive vice-president of the railway, who, more than any other man, is responsible for this unusual contribution to the car builders' art.

In these experiments certain premises of the management were clearly established:

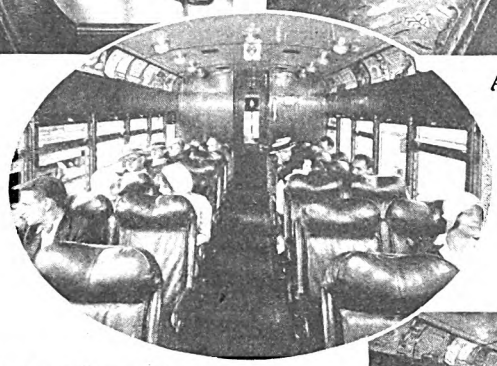
1. That it was possible to build a car of aluminum and steel which, while light in weight, would possess the necessary staunchness and rigidity for sustained speeds on level tangent track in excess of 75 m.p.h. and also have satisfactory riding qualities.
2. That it was possible to obtain these results with a low-level truck, using 28-in. wheels, provided the adaptations and changes worked out during these experiments were made in the truck design to withstand the extreme stresses and to absorb and cushion the magnified road shocks, side sway and other forces incident to such high speeds.
3. That, all things being equal, a car of the low-level type would ride much better at high speeds than the conventional interurban car.
4. That the attainment of such speeds was conditioned upon the evolution of motors which would meet the truck clearance limits and possess the power necessary.
5. That with such high speeds one of the most serious problems was braking, and that methods of braking additional to air brakes must be employed. The new cars are equipped with both air and magnetic brakes, interconnected so that the latter come into use only after the air-brake application approaches the safe limits of wheel friction.
6. That to attain great speed the lines of the car itself were important. The roof must be as low as possible consistent

Digitized by Google

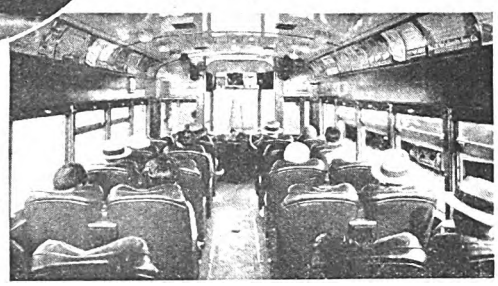
Luxurious fittings are used in the observation-lounge compartment



An unobstructed view is obtained from the rear of the observation compartment



Comfortable seats are used in the coach, and the entire front end of the car has been opened up so that passengers may look ahead



Revolutionary and luxurious equipment attaining speeds in excess of 80 miles per hour permits a brand-new type of long-distance passenger service. Rapid increase of business is being made without undermining existing traffic

Railroad and the Bus

with proper ventilation and interior appearance, and the lines of the car such that it would not tend to "float" at high speeds. The car should be streamlined, and the roof lines should be so designed as to increase the traction at high speed.

Clear Vision Front Deemed Essential

From interviews by the company's traffic supervisors and checkers with hundreds of passengers, both on its own rail and bus lines and those of competitive steam railroads and interstate bus lines, the management became convinced that one of the major objections of the traveling public to the interurban car in favor of the bus was that the bus passenger's view was unobstructed; he could see where he was going and enjoy the scenery in front as well as on either side. This greatly increased his interest and enhanced the attractiveness of the journey. While it was recognized that electric railway operators were reluctant to have the front ends of their cars "opened up" because of the danger of flying glass in collisions, the management determined to adopt the characteristics of the bus and of the limousine and by placing shatter-proof glass in all front and rear sash of the car, reduce or eliminate this hazard. Moreover a metal bulkhead with shatter-proof glass between the front corner posts of the car at the rear of the platform, forms, as it were, a second line of defense to the passengers in the event of a collision.

Interesting and serious construction problems were presented in thus opening up the front of an interurban car designed to operate at unusually high speeds. Unusual aerostatic pressure would be encountered. The problem of making a car airtight in severe weather must be solved. Because the rear was to be arranged like a steam railroad observation car, it was necessary that all passengers should enter and leave, except in emergency, through the front door. With the future possibility of operating in the Cincinnati subway, it was decided, rather than to have the door extend to the bottom of the lower step, to use a short door and a hatch, mechanically operated and weather and wind proof.

The primary problem was the development of motors within the clearance limits with power to attain the desired free running speed of at least 75 m.p.h. After prolonged negotiations, both General Electric and Westinghouse contracted to construct such motors.

One-half of C. & L. E.'s new interurban cars are the de luxe observation-lounge type; the remainder are coaches. In neither is provision made to carry dispatch freight or trunks—the management being convinced that passengers will not tolerate delays to load merchandise or heavy baggage. Trunks and dispatch freight are handled on certain local runs at times of light traffic, where the type of car purchased in 1927 is operated. In their general features the new coach and the de luxe car are

Digitized by Google

Table I—General Specifications and Dimensions, Cincinnati & Lake Erie Cars

Length over all	43 ft. 9 in.
Length over body posts	33 ft. 10 in.
Truck wheelbase	6 ft. 2 in.
Bolster centers	23 ft. 2 in.
Width over all	8 ft. 9⅛ in.
Height, rail to trolley base	11 ft. 4 in.
Height, rail to car floor	39 in.
Body	Steel and aluminum
Heat insulating material	Compressed cork
Interior trim	Aluminum, finished in imitation of walnut and old ivory
Motors	Ten cars-General Electric No. GE706-A Ten cars-Westinghouse No. 539-A
Trucks	ABC—74 D (Cincinnati Car Corporation)
Wheels	Rolled steel, 28 in. diameter

Weights:

	De Luxe Type; Westinghouse Equipment	Coach Type; General Electric Equipment
Trucks	12,300 lb.	12,300 lb.
Brakes—Air 2,900 Magnetic 1,300	4,200	4,200
Car body, with toilet room equipment	13,200	13,200
Seats	2,400	2,400
Other accessories	1,100	1,100
Sub-total	33,200 lb.	33,200 lb.
Motor and control equipment	14,600	15,100
Totals	47,800 lb.	48,300 lb.

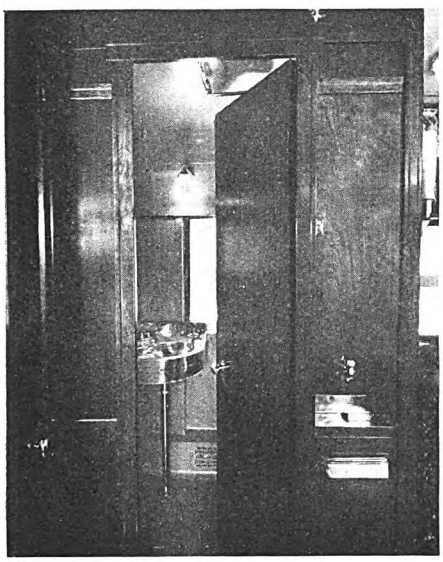
identical except that the space set apart as an observation-lounge in the de luxe type is fitted with transverse seats in the coaches and no luggage compartment is provided in the coach, a small space being reserved for this purpose behind the rear seats.

The railway has had in force about a year a successful profit and savings sharing plan by which its employees participate in the fruits of economies and increased profits. When the time came to formulate definite plans for the operation of the new equipment and the inauguration of the new long-distance high-speed service, President Conway submitted to the trainmen a proposal that all passenger service on the Columbus and Toledo divisions should be operated by one man and that all de luxe service on the system should be so operated. After thorough consideration the men voted to adopt the plan. One-man operation of this service has been entirely successful; both men and management are enthusiastic concerning it. An interesting feature was that, through the introduction of the blue ribbon long-distance service, enough additional car-hours were run to provide employment for all trainmen. Thus it has been possible to give a largely augmented service with a relatively low increase in operating expenses.

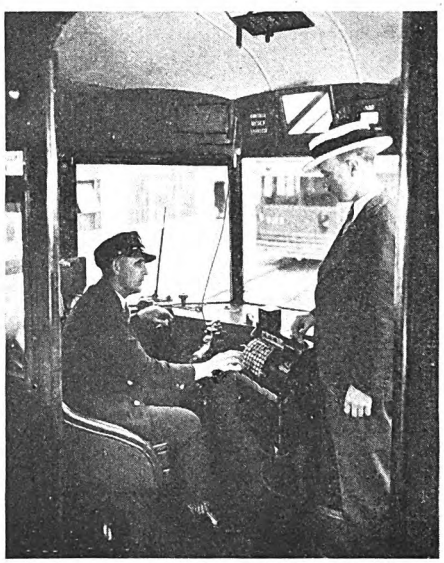
The salient features of the specifications of the new cars are summarized in Table I.

The first impression gained is that the car is very low. Its riding qualities, unusual even in a car for ordinary speeds, are due to its low center of gravity, made possible by the use of a low-level type of truck, the absence of high bolsters and the low roof. The taper of the ends to cut down wind resistance is clearly apparent, as is also an adherence to recent notable tendencies in automobile design such as high body sides, or a relatively high window sill. By thus bringing up the window ledge the problem of keeping the car comfortable at high speeds in severe winter weather is minimized. Drafts when the windows are raised in the summer also are reduced. It is, moreover, possible to raise the window sash sufficiently to avoid interference with vision. The relatively high side sheathing and wide letterboards give the car an appearance of solidity and permit a maximum of diagonal and lateral bracing. Concealed lights on the front dash, standard on earlier C.&L.E. equipment, were retained, as were the lamps at the four corners of the car, which the company has found greatly decreases automobile collisions in city streets. Space is provided on the front dash to carry signs for company advertising. Because of the speeds attained, a special locking device had to be devised to prevent these signs from being blown off. A double Hunter illuminated sign shows the destination of the train in white and its name in red letters, a black background being used for both. Attractive train emblems, similar to those on the crack steam railroad trains, are carried on the rear of all de luxe cars. The names of these trains were selected from some 1,211 submitted by employees and their families in a cash prize contest inaugurated by the company. The art work in connection with the train emblems was executed by the Geyer Company, advertising agent of the railway. Upon the inaugural trip of each of these trains, the respective prize winners and their families were the guests of the management. This tangible recognition of the part which the employees played was featured in the local newspapers as a "human interest" story.

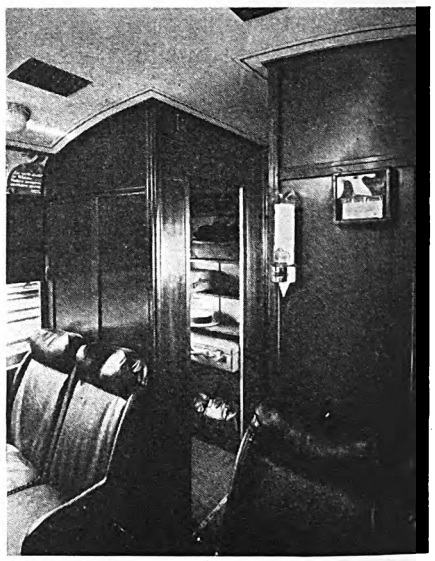
Of the 38 lineal feet inside the car, exclusive of the



The latest Pullman fixtures are installed in the toilet



Fare collection is made easy by use of a special cash register



Luggage compartments are an appreciated feature of the de luxe cars

Digitized by Google

toilet and luggage compartment, 14 ft., or approximately 37 per cent, are contained in an observation-lounge section in the rear. This section is furnished attractively with large, comfortable lounge chairs and couches upholstered in mohair and small reading tables, carrying attractive reading lamps, spaced at convenient intervals. A Wilton carpet covers the floor. The forward section of the car is equipped as a coach.

In the design of seats for these coaches, the plan originally worked out by the Conway interests for the Chicago, Aurora & Elgin was adhered to. Care was taken to make sure that the seats were low enough to be comfortable for the short-legged passenger. Seat centers were spaced at 33 in. to give plenty of leg room. After much experimentation the proper construction of seat cushions and back cushions was determined to give comfort without excessive springiness, tending to intensify road vibrations. A type of headroll was chosen which would invite relaxation but not be so bulky as to strike the hat. The seats are finished in genuine green leather. They are 39½ in. wide and designed to "fit the back."

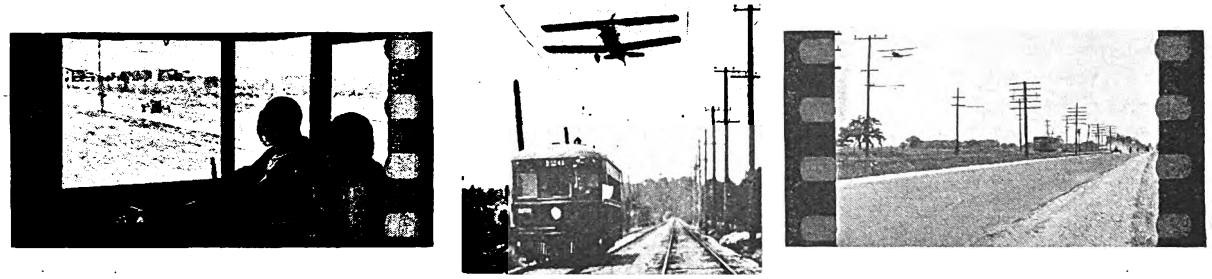
Believing that the operator should be as comfortable as the passenger, equal care was given to the design of his seat. Sample seats embodying varying characteristics were constructed by the Hale & Kilburn Company and shipped to the plant of the Cincinnati Car Corporation, which received the contract for the construction of the cars in accordance with the plans and specifications of the company. These seats were set up in a dummy front end, or platform, in which was located the controller, air-brake valves and other apparatus to be placed on the operating board of the car. The trainmen's cooperative committee then journeyed to Cincinatti, and after explanation of the features of the operator's board, made a careful study of the arrangement from the standpoint of the trainman. The outcome was an entire rearrangement of the operator's board. All apparatus on the front end of the car is inclosed, avoiding unsightly piping, wiring, etc., and improving the appearance of the car. In accordance with the practice on its Cincinnati division, the National cash register is used to record fares.

The new car is equipped with the most modern type of toilet, and the latest sanitary standards have been observed in providing iced water for passengers. Another special feature of the de luxe car is a luggage compartment, situated opposite the toilet.

Remarkable Acceleration and Speed Shown in Tests

In the official tests of these cars, conducted by the railway and representatives of Westinghouse and General Electric, respectively, recently concluded, results were obtained that exceeded all expectations. These are summarized in Table II.

No interurban car has ever equalled the speed developed by this new equipment. Many miles have been "clocked" by competent and experienced observers in which the new cars ran better than 90 m.p.h. The particularly remarkable thing about these cars is that at such high speeds their riding qualities are better than those encountered upon many Class 1 steam railroad observation cars on crack trains. There is a reassuring absence of side sway, tremor or vibration. The passenger enjoys the exhilaration of air flight, where no air pockets are encountered, but without its noise and vibration. In the earlier days of operation, many men who thought they had fast automobiles tried their luck in racing these fliers. They were soon left far behind. Certain of the de luxe trains overtake and pass such steam trains as the "Ohio State Limited" to the great amusement and gratification of the interurban's passengers.



The fast trains broke into the movies by winning races against an automobile and an airplane

The Cincinnati & Lake Erie Railroad, like the typical interurban, runs on city streets in several places. The high speed of its equipment is not required for city service, but it enables the cars to make up for time lost in necessarily slow operation on these streets and to land the passenger at his destination in such good time as to induce him to use the interurban in preference to the steam railroad or his own automobile.

Illustrating the advantages of speed, on the Toledo division, the average schedule speed of the de luxe runs on private right-of-way, i.e., excluding city streets, is 46.25 m.p.h. The average schedule speed under such conditions on the Columbus division is 54.1 m.p.h. In other words, this new equipment, like the fleet automobile, when on city streets can observe traffic regulations and the requirements of safety, but make the required schedule by sustained high speed in open country.

"We're in the Movies Now"

The Cincinnati & Lake Erie achieved the goal of all publicity men by breaking into the movies when *Pathé News Weekly* made a sound film record of the staged race between one of its flyers and an airplane. This footage was incorporated in a regular *News Weekly* which has been shown to millions of people all over the

Table II—Results of Speed and Acceleration Tests on the New C. & L. E. Cars

	Coach Type Cars, Equipped with General Electric Motors	Observation-Type Cars, Equipped with Westinghouse Motors
Rate of acceleration, m.p.h.p.s.	1.7	1.6
Rate of braking, m.p.h.p.s.	5.25	4.95
Distance to stop from full speed, after emergency brake application, feet	918	1,040
Observed free running speed on level tangent track, m.p.h.	79.8	83.8
Average d.c. energy consumption per car-mile, measured at the car, kw.-hr.	3.88	3.89

Digitized by Google

Each of the blue ribbon trains was given a name in a competition among employees.

United States since Juy 12. Incidentally, the company's executive officers have had many letters of inquiry from interested electric railway officers who have seen this movie in their neighborhood theaters.

Emulating Pathé's example, the Mayfield Photo Service, which produces movie film of interesting events for local theaters, requested permission to arrange a speed contest between a special racing automobile and one of the flyers. It was decided to hold this race between Springfield and Columbus where the National Pike parallels the railway private right-of-way. In order to insure the safety of the automobile, motorcycle police escorts were provided to clear the road. The race was photographed from the interurban car, from an airplane and from fixed locations along the road. The film tells an exciting story. The automobile beat the interurban on the getaway and the succeeding footage shows the tremendous speed which both attained. The motorcycle police found it impossible to hold the pace and gradually fell behind, but fortunately the road at the time was reasonably free of traffic. The racing car tore on, but little by little the interurban forged ahead; when the race was over the automobile was fifteen lengths in the rear.

The large movie houses in Ohio were quick to see the sporting aspects of these thrilling contests. The State Theater in Dayton featured it during the week beginning Aug. 9. At the theater's request, the railway made arrangements to run "The Red Comet" over the city tracks in Dayton. The car was covered with banners on either side, announcing the moving picture feature and was equipped with a radio-phonographic reproducing device to attract the attention of passers-by. An unusually large attendance at the State Theater during the week was reported. Other large moving picture houses throughout the C.&L.E. territory have run a similar film.

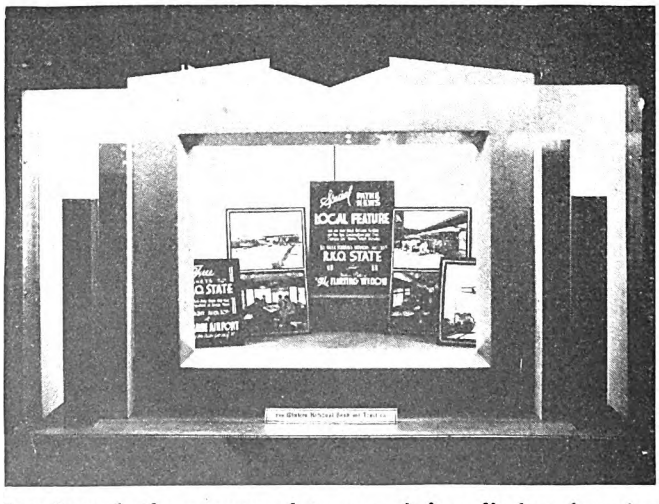
The management is convinced that this moving picture publicity is the most valuable advertising which the new service has secured. It dramatized, as nothing else could have done, the epochal character of the new innovation in transportation. It aroused the sporting instincts of many thousands of people; it created the desire to ride upon this new service. Above all, it carried to thousands of motorists the lesson that, from this time forth, the automobile driver should exercise extreme caution in crossing the tracks.

Prior to the inauguration of the new service a vigorous and carefully prepared publicity campaign had been mapped out and was progressively executed. The company's publicity agents furnished news stories to the local press, chronicling in turn the imminence of the completion of the cars, the delivery of the first car, its preliminary trials, the general nature of the changes decided upon, the successive arrival of additional cars, steps taken to train the crews in the new equipment, the work being done by the maintenance-of-way and line departments in preparing the property for the new fast service, and, in general, the revolutionary character of the service contemplated.

In this way, the curiosity and interest of the public and of the newspaper editors were gradually fanned. On Sunday, June 29, the Geyer Company, as the representative of C.&L.E.., was host to some 150 newspaper men and women representing the daily and weekly publications in the various cities and towns served. They were brought to Dayton in the new de luxe observation type cars. At the luncheon explanation was made of the plans for giving publicity to the new service, both through news stories and through paid advertising. Many questions were asked and answered. The guests were returned to their homes in the de luxe equipment. This luncheon greatly quickened the interest of the newspapers in the bold experiment, and gave to their editors first-hand knowledge of the attractiveness and comfort of this new service.

Cars Exhibited in Leading Cities

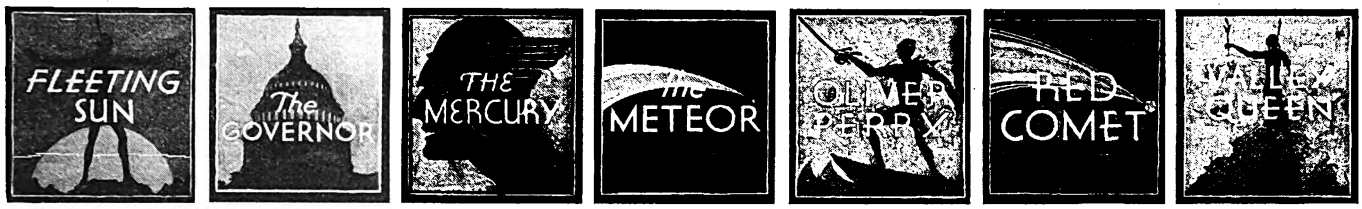
Between July 15 and 19, a new de luxe type car and a new coach were placed side by side with the old equipment previously used on the I. C.&E. or Lima-Toledo properties, in the public square or other prominent location in Cincinnati, Columbus, Dayton, Toledo, Springfield, Hamilton, Lima, Bellefontaine, Middletown and West Jefferson. This display of the new equipment was currently advertised in the local press. Many thousands of people passed through these cars. Representatives of the company's traffic and operating departments, as well as picked men from among the train crews, were in attendance. In addition to distributing a souvenir booklet picturing the new cars and explaining the high-speed service, these men answered many questions.



Prominent banks co-operated to use window displays featuring the movies of the races won by the new cars

In order to appreciate the significance of the new service made possible with the de luxe equipment, it is necessary to consider briefly the recent

Digitized by Google



These are reproductions of the illuminated signs carried at the rear of the trains

history of the property. The Cincinnati & Lake Erie Railroad, the president of which is Thomas Conway, Jr., came into existence on Jan. 1, 1930, at which time, coincident with taking title to the Indiana, Columbus & Eastern and Lima-Toledo properties, the Cincinnati, Hamilton & Dayton Railway changed its name. These acquisitions gave the consolidated company a through interurban line from the Ohio River, at Cincinnati, to the Great Lakes at Toledo, a distance of 220 miles, as well as a fast east-and-west line connecting Dayton, Springfield and Columbus. The distance from Dayton to Columbus is 72 miles.

Readers of Electric Railway Journal are familiar with the notable success achieved by the Conway interests in the upbuilding of the C.,H.&D. property. These interests acquired this property early in 1926 after a checkered career of receiverships, abandonments and prolonged litigation extending over a period of some nine years. Steps were immediately taken to modernize the property. Interurban trackage was reconstructed in large part and rehabilitated throughout; the power supply was modernized, new automatic substations being constructed and an adequate and reliable source of power provided; a modern car shop was acquired at Moraine, just south of Dayton, at which point the company's offices also were established. Finally, all old equipment was scrapped and new equipment was purchased and put into service. The running time was shortened, schedules were rearranged to give frequent and convenient trains, modern methods of selling service and developing traffic were instituted, and a vigorous publicity policy was inaugurated and steadily prosecuted. In consequence, the C.,H.&D., unlike other interurban carriers of Ohio, in the years from 1926 up to the beginning of the current business depression, not only held its traffic against the inroads of the private automobile, but actually increased its passenger revenues. This unusual achievement attracted the attention of the entire industry.

The most rapidly growing portion of the road's business, however, was the freight traffic. This business was handled almost entirely in conjunction with neighboring interurban lines. After prolonged study, the management finally decided that the investment of substantial sums, year after year, in developing freight business, in the face of the highly uncertain future of the connecting interurban lines reaching the principal traffic centers on Lake Erie, was of doubtful wisdom. Accordingly, the C.,H.&D. acquired title to them. The Conway management believed that in addition to freight it could successfully develop a substantial passenger traffic on the interurban lines north and east of Dayton, which connect large centers and pass through farming country and villages.

Automobile Competition Severe

The railway lines are paralleled throughout by improved concrete highways, the National Pike between Dayton and Columbus and the Dixie Highway between Toledo and Cincinnati. The I.,C.&E. and Lima-Toledo lines in past years have felt the full force of automobile competition, and in earlier years were subjected to motor bus competition. These motor bus lines were acquired by the Conway interests, in conjunction with the interurban properties. At once the motor bus and rail passenger rates were made identical, and tickets interchangeable, making it possible for the passenger to use either the rail or the bus, as he might elect. Motor bus and rail schedules were co-ordinatd.

Prior to the acquisition of the I.,C.&E. and Lima-Toledo lines, the management made a thorough survey of their passenger traffic possibilities. The conclusions were that the possibilities for the development of local traffic, of the type formerly handled on the I.,C.&E. and Lima-Toledo properties, were either non-existent or exceedingly limited. Some additional traffic would doubtless be attracted by new, attractive modern and fast cars, operated in local service. Dr. Conway became convinced that the only promising field involved the creation of a brand new type of service to attract long-distance pas-

The movies were well advertised by running cars covered with banners through the main streets of several cities

Digitized by Google

sengers between Cincinnati and Toledo, Cincinnati and Columbus, Dayton and Columbus, or Dayton and Toledo, for example—distances ranging from 71 to 220 miles. The development of this business, however, involved getting the roadway into condition to permit of very high-speed operation and evolving a type of interurban car which would embody the comfort and speed which the management believed the public demanded. Early in 1929, prior to taking title to the other properties, an extensive rehabilitation program was inaugurated to permit of high-speed operation. At the same time a new type of flashing light highway crossing signal was evolved by the company's staff and installed at important highway grade crossings on the property.

On Sunday, July 6, the new high-speed through service with observation-lounge car equipment was inaugurated. This consists of three daily limited trains each way between Cincinnati and Toledo, with connections for Detroit; three each way between Cincinnati and Columbus, and two additional de luxe limited trains between Dayton and Columbus. This gives the passenger traveling between Cincinnati and Dayton the choice of six limited trains. The passenger between Dayton and Columbus has the choice of four limited trains; while traffic between Dayton and Springfield is served by seven limited trains in each direction daily. In addition, the local service is retained without change.

New Reduced-Rate Excursion Tickets Introduced

The management is convinced, as a result of its experiments in the past two years, that many interurban railroads have advanced their fares to a point beyond that which will yield the maximum return; certainly this was true on many parts of its own property. The public compares first-class interurban service more closely with bus service than with steam railroad service. An endeavor to charge fares approximating those of a steam railroad drives traffic to any competing buses, or to the private automobile. The company believes that the aim should be to improve the load factor—the proportion of occupied car seats and the number of profitable trains operated daily—and should charge that rate of fare which will produce the maximum operating revenue and the highest load factor.

Coincident with the introduction of the new de luxe service and new equipment in the local service, a system of special tickets was offered at attractive rates, designed to develop business. Prior thereto round-trip tickets cost twice the one-way rate, but under the new plan five-day round-trip tickets between important centers are sold at substantial reductions. Week-end excursion tickets also were instituted. A comparison of rates before and after July 6 between typical important stations is given in Table III.

No extra fare is charged for the de luxe service, either in the coach portions of the car or in the observation-lounge section. A passenger can ride for the same cost on the de luxe service, the regular local service, or in the company's bus lines, as he may elect; the special tickets above mentioned are accepted on all three.

The existing rates applicable to country stops and small towns or villages were not changed, but with special tickets and rates a successful drive is being made for this type of business.

Some interesting experiments have been made in the stimulation of relatively short-haul interurban traffic. In the summer of 1929 a special one-day round-trip rate of 50 cents was offered between Middletown and Hamilton, a distance of about 12 miles, and a special twelve-ride ticket, good for 30 days, selling for $2.50. Previously the round-trip rate was 80 cents, or double the one-way fare, and no special ticket had been sold. The purpose of these experimental rates was to determine to what extent the workers in factories in either city, residing in the other, could be induced to use the interurban rather than their automobiles. In two months the revenue passengers between these cities increased 97 per cent.

On the Columbus division, about 11 miles east of Dayton, is the village of Osborn, at which are the plants of the Wabash Portland Cement Company and the Southwestern Cement Company. These plants employ a considerable number of workers living in Dayton, and many Osborn residents travel back and forth to Dayton to business and to shop. The one-way fare between Dayton and Osborn was 30 cents and the round-trip 60 cents. The one-way rate remains unchanged, but on July 20

Table III—Round-Trip Ticket Rates on the Cincinnati & Lake Erie

Between	Miles	Rate Prior to July 6	New One-Day Rate	New Five-Day Rate	New Week-End Rate
Cincinnati and Dayton	60	$2.90	$2.25	....	$1.35
Dayton and Columbus	71	4.50	3.00	....	2.25
Dayton and Springfield	27	1.60	1.00	....	1.00
Dayton and Lima	93	4.40	3.50	....	2.35
Springfield and Lima	66	3.90	3.00	....	2.15
Columbus and Lima	110	6.80	5.00	....	3.50
Springfield and Columbus	45	2.90	2.00	....	1.55
Cincinnati and Springfield	86	4.50	4.00	....	2.15
Springfield and Toledo	139	8.20	....	$6.00	4.10
Columbus and Toledo	183	8.80	....	6.50	3.90
Cincinnati and Columbus	131	7.40	....	5.00	2.85
Cincinnati and Lima	152	7.40	....	5.75	3.65
Cincinnati and Toledo	225	12.70	....	8.00	4.60

Table IV—Record of Ticket Sales by Weeks

Week Beginning	Tickets sold (equivalent one-way trips)
July 20	189
27	190
Aug. 3	274
10	338
17	488
24	432
31	556

Table V—Earnings of De Luxe Service by Weeks

Week Beginning	Earnings per Car-Hour
July 6	$5.86
13	7.44
20	7.95
27	8.77
Aug. 3	9.43
10	9.69
17	11.02

Table VI—Comparison of Aggregate Receipts from Ticket Sales at Principal Stations of the C. & L. E.

Office	Per Cent Increase: July 1930 Over June 1930	August 1930 Over June 1930	August 1930 Over August 1929
Dayton	16	32	40.5
Columbus	18	46	43
Toledo	16	39	....
Cincinnati	74	662	....

Table VII—Effect of New Service on Local Car Earnings

	Local Rail Service Receipts, Cents Per Car-Mile: Cincinnati Division	Columbus Division	Toledo Division
Average earnings in month preceding inauguration of blue ribbon service—June, 1930	36.9	35.8	21.4
First month of operation of de luxe service—July (de luxe service in effect 25 days only)	36.5	27.7	21.2
Second month of operation of de luxe service—August	37.1	27.4	21.8

Digitized by Google

the round-trip rate was reduced to 40 cents. This change was advertised in the local newspapers. A leaflet giving the new rates and the schedule of trains was distributed by employees of the company in a house-to-house canvass. The record in Table IV of ticket sales by weeks since this change was made is most interesting.

Encouraged by the success of these experiments, it is planned to cover in similar fashion a number of other communities of secondary size served.

One of the most impressive features of the de luxe service is the steady increase in its traffic and earnings, week by week. The record is summarized in Table V.

According to the statistical studies of the American Electric Railway Association, the average passenger earnings of 34 interurban lines throughout the country in 1929 averaged $9.29 per passenger car-hour.

The increase of travel from the new service also is clearly seen in a comparison of ticket sales at important stations. Table VI shows substantial gains at Dayton, Columbus and Toledo, ranging from 16 to 46 per cent. The showing at Cincinnati has been more spectacular than at any station on the property, the aggregate ticket sales in August being 662 per cent in excess of the June business. The most significant feature of this record is that it has been created in a period of intense depression, when industrial employment and general business conditions were tending downward.

Newspaper representatives from cities in the C. & L. E. territory were brought to Dayton and entertained at a banquet by the company's advertising agents

Earnings of the Local Rail Service Hold Up

The blue ribbon trains make no stops in the rural districts or in the smaller villages and make only a limited number of stops in the larger cities and towns. In the rural districts the de luxe service is not competitive with the local service, which was continued without change. It does offer competition, however, for traffic between the larger communities, which constituted the major portion of the previous business.

The effect of the de luxe service upon the earnings of the local rail service is pictured in Table VII. The astonishing fact disclosed is that, with the exception of the Columbus division, the de luxe service apparently drew no traffic from the locals. The volume of de luxe service operated on the Columbus division between Dayton and Springfield is somewhat greater than on any other division.

Through a subsidiary company the Cincinnati & Lake Erie operates motor bus service paralleling its Columbus division. The de luxe service and the new and more attractive equipment in the local service have diverted about 12 per cent of the traffic from this bus line, although new buses were installed a few weeks prior to the introduction of the new rail cars and no change was made in the bus schedules. The diversion of business is due to the much higher speeds and greater comfort and convenience of the rail service. The scheduled running time from Dayton to Columbus of the local rail service is 40 minutes less than on the bus, while the de luxe service makes the trip in 55 minutes less time than the bus. It was, of course, impossible to speed up the bus service to keep pace with the rail service, both for physical reasons and because of the speed limits stipulated by the Ohio commission and the state law.

A substantial amount of the de luxe business has been diverted from the interstate buses, especially between Cincinnati and Detroit. The scheduled running time of the de luxe service, including the connection from Toledo to Detroit, is 1 hour and 45 minutes less than that of the interstate bus lines. In other words, this epochal experiment seems to show clearly that a fleet, comfortable rail car, embodying de luxe features, to a very large degree will supplant the motor bus in popular favor.

But the most important lesson to be drawn from this experience is that the high-speed blue ribbon service has developed brand new business for the interurban — traffic which theretofore had used neither the local rail service nor the company's bus line. Where this new business comes from cannot accurately be determined. Interviews with passengers on the de luxe trains, however, indicate that it is made up, in the main, of traffic diverted from the steam railroads and from the private automobile. It is perhaps significant that on July 27 the Big Four Railroad withdrew two trains—the east and westbound trips of the "Senator"—between Cincinnati and Columbus. A large part of the de luxe travel has been business which has been stimulated or created through constructive publicity and modern methods of passenger solicitation, much of which would not have moved otherwise.

Interdependence of Industry and Transportation Emphasized

EFFECTIVE publicity and merchandising is being carried on by the United Railways & Electric Company, Baltimore, Md., through its car-rider publication *Trolley News*. To emphasize the interdependence of industry and transportation is the object of a series of articles being presented under the general heading "Arteries of Industry." In each issue of this pamphlet, one of the larger Baltimore industries and its product is described, setting forth its importance in the industrial life of the city and emphasizing the fact that the great majority of employees use the street car lines and that the industry is dependent upon and really owes its development to the transportation service.

The following paragraph, used as a preface to each article in the series, repeatedly drives home the basic thought that:

> Today the strength of American Industry flows through its transportation lines. These brief sketches will aim to tell something about the dependence of Baltimore's great and rapidly growing industries upon public transportation and what is being done to keep pace with this growth.

The industries themselves are appreciative of this publicity and in many cases have asked for additional copies for their employees and customers.

Digitized by Google

Cost Analyses Indicate Field of the Trolley Bus

By W. J. Clardy
General Engineer
Westinghouse Electric & Manufacturing Company

BECAUSE it permits the economic expansion of the field of street railway business, the trolley bus is a useful tool for increasing transportation revenue. It offers a means of providing service in the smaller cities, serving closely built-up districts that do not quite justify street cars, or extending into new territory in the larger cities with a reasonable investment and low operating cost. Moreover, it saves expensive track reconstruction on lightly traveled railway routes, thus permitting continued service at reasonable cost.

It is interesting to consider the trolley bus from the economic standpoint, in comparison with the street car and gasoline bus under various conditions. An accompanying table gives an analysis of the costs of the three means of transportation for two particular conditions of operation. The figures indicate that the trolley bus is preferable to both the street car and gasoline bus for light traffic routes, but is not as economical as the street car for heavily traveled routes. Obviously, there is a point approaching the operation represented in the heavy traffic table where the trolley bus will serve as economically as the street car. Installations in Chicago, Salt Lake City and Detroit have proved this point to be rather high.

A route which has from light to medium traffic represents the ideal application for the trolley bus. For example, consider a line with a one-way trip of 5 miles, operated with a five-minute rush-hour headway and a ten-minute base headway. The total annual cost of operation, including depreciation, taxes and interest, will be: street cars, $216,000; trolley buses, $169,300, and gasoline buses, $202,500. Thus, there is an annual saving of $46,700 for trolley bus operation in comparison with street cars and $33,200 in comparison with gasoline buses. This, of course, is a specific example based on average operating costs which naturally vary for different sections of the country.

A heavy traffic route presents a different picture. If the travel on the same 5-mile line requires a 40-passenger trolley bus every two minutes it is well to consider the use of street cars. A large capacity car, seating 56 passengers, operating on a three minue rush-hour headway, will provide practically the same number of seats and have a greater margin in rush-hour capacity. The total annual cost of operation, including depreciation, taxes and interest, will be: street cars, $333,700; trolley buses, $395,600, and gasoline buses, $474,000. In this case street cars will effect an annual saving of $61,900 in comparison with trolley buses and $140,300 in comparison with gasoline buses.

From this it is evident that the trolley bus has a very definite field of usefulness. Extensions into new territory, some of which may require street cars after the traffic develops; light traffic trolley lines where track needs reconstruction; well-developed residential districts, and routes with medium to fairly dense traffic represent the most advantageous uses for trolley buses.

Comparative Investment and Operating Costs of the Street Car, Trolley Bus and Gasoline Bus

	Light Traffic Route			Heavy Traffic Route		
Investment Costs	Street Car, 42-Passenger	Trolley Bus, 40-Passenger	Gasoline Bus, 40-Passenger	Street Car, 56-Passenger	Trolley Bus, 40-Passenger	Gasoline Bus, 40-Passenger
Route-miles (double track for street car)	5.00	5.00	5.00	5.00	5.00	5.00
Units required in rush hour and one spare	12	13	15	21	29	32
Cost of each unit	$13,000	$12,500	$10,500	$14,000	$12,500	$10,500
Total cost of rolling stock	156,000	162,500	157,500	294,000	362,500	336,000
*Cost of double track and paving	530,000	.....	.....	530,000	.....	.....
*Cost of contact system, including feeders	41,500	58,250	.....	41,500	58,250	.....
Total investment	$727,500	$220,750	$157,500	$865,500	$420,750	$336,000
*Includes ½ mile of single track to carhouse						
Operating Data						
Rush-hour running time, including layover, in minutes	27½	27½	30	28½	26	28
Base-hour running time, including layover, in minutes	25	25	25	24	24	24
Rush-hour headway (six hours daily), in minutes	5	5	5	3	2	2
Base-hour headway (twelve hours daily), in minutes	10	10	10	6	4	4
Rush-hour schedule speed, in miles per hour	12½	12½	11½	11-3/10	12½	11½
Base-hour schedule speed, in miles per hour	13½	13½	13½	13½	13½	13½
Annual vehicle-miles	506,600	506,600	506,600	844,800	1,268,200	1,268,200
Annual vehicle-hours	44,080	44,080	45,980	73,250	105,130	108,880
Operating Costs						
Energy, in cents per mile (1.25 cents per kw.-hr. for elect'cal energy)	4.13	2.50	5.17	4.41	2.50	5.17
Equipment maintenance, in cents per mile	3.10	5.00	7.00	3.35	5.00	7.00
Conducting transportation, in cents per mile	12.71	12.21	12.41	12.71	11.98	12.16
Maintenance of way and structures, in cents per mile	3.13	1.00	....	3.13	1.00	....
Traffic, in cents per mile	0.12	0.25	0.25	0.12	0.25	0.25
General and miscellaneous, in cents per mile	4.62	5.00	5.77	4.62	4.25	4.70
Total, in cents per mile	27.81	25.95	30.60	28.34	24.98	29.28
Annual cost of energy	$20,940	$12,680	$26,220	$37,250	$31,700	$65,500
Annual cost of equipment maintenance	1,,710	25,350	35,500	28,270	63,300	88,650
Annual cost of conducting transportation	64,500	62,000	63,000	107,350	151,800	154,000
Annual cost of maintenance of way and structures	15,870	5,070	.....	26,430	12,680	.....
Annual cost of traffic, in dollars	610	1,270	1,270	1,010	3,170	3,170
Annual cost of general and miscellaneous	23,450	25,350	29,250	39,100	53,850	59,500
Total annual operating costs	$141,080	$131,720	$155,240	$239,410	$316,500	$370,820
Total Annual Costs						
Operating	$141,080	$131,720	$155,240	$239,410	$316,500	$370,820
Depreciation of vehicles (5, 10 and 20 per cent)	7,800	16,250	31,500	14,700	36,250	67,200
Depreciation of right-of-way (3 per cent)	15,900	.....	.....	15,900	.....	.....
Depreciation of overhead (3 per cent)	1,250	1,750	.....	1,250	1,750	.....
Taxes (1.25 cents per mile)	6,350	6,350	6,350	10,540	15,840	15,840
Interest (6 per cent)	43,600	13,220	9,450	51,900	25,250	20,100
Total annual costs	$215,980	$169,290	$202,540	$333,700	$395,590	$473,960

Digitized by Google

TRAFFIC IMPROVEMENTS

Planned for Kansas City

Greater speed combined with safety is anticipated in recommendations of report to the Chamber of Commerce made by the Erskine Bureau. Extensive use of safety zones and loading platforms, elimination of parking and adoption of a new traffic ordinance are urged

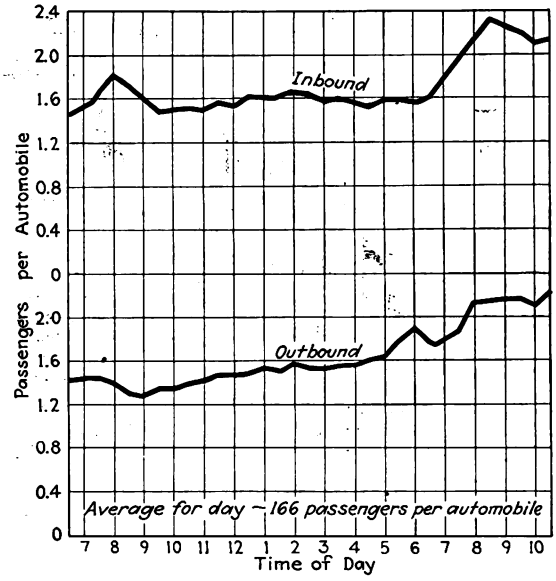
MANY forward-looking recommendations for improvement of traffic conditions in Kansas City are contained in the report of the Albert Russel Erskine Bureau which was prepared for the city-wide traffic committee of Kansas City. The survey was sponsored and the report published by the Chamber of Commerce of Kansas City, of which Conrad H. Mann is president. Preparation of the report, which has required approximately one year, was under the general supervision of Dr. Miller McClintock, director of the Erskine Bureau. This article discusses in brief such of the sections of the report as are of general interest to transportation men.

Design of a balanced and co-ordinated system of traffic control for Kansas City was the primary purpose of the report. The principal specific conclusions and recommendations are contained in a consolidated system of traffic rules and regulation. In the main, the provisions follow along the lines laid out by the National Committee on Street and Highway Safety.

The only legitimate end of traffic control, states the report, is to obtain the maximum convenience and economy of movements consistent with public safety, giving due consideration to the equities of pedestrian, street car and vehicular traffic. Accordingly, all regulations proposed have been carefully weighed with respect to the economic effect, and an attempt has been made to design a system of control which will give a maximum economy in current operations and such improved access as is necessary to provide a stabilization of business site values. In order to spread the traffic load, it is proposed that retail establishments in the central district open at 9:30 a.m. and close at 6 p.m.

Certain special conclusions with respect to safety improvements were considered necessary. It was felt that preventive activities could be amplified during the periods of greatest accident frequency, which are daily from 5 to 6 p.m., weekly on Saturday and Sunday, and in the annual period between August and December, inclusive. It is proposed that an adequate driver's license law should be passed by the State of Missouri in order that drivers' skill and discipline may be increased. Sound driving habits should be encouraged and traffic warning signs be used much more generously than they have in the past.

One of the outstanding features of the report is the plan for parking control. In order to provide an ultimate solution of the intown terminal problem for automobiles, it is concluded that in new buildings special attention should be paid to the incorporation of parking facilities within building lines, or in locations closely adjacent. Business interests should foster the construction of central district garages, further development and utilization of parking lots, and should consider the special advantages to be obtained from the so-called self-contained block.



Passengers per automobile in the central district vary with the direction and time of day

Specific proposals are made for further pedestrian control and protection. Platform safety islands are recommended in the centers of wide streets with heavy vehicular and pedestrian traffic and at street car stops. Temporary minimum protection at such places should be provided by improved button-marked zones. Where such minimum standard temporary zones have been established, the prohibition against vehicles operating to the left of zones at street car stops should be removed.

Attention is given to the improved administration of traffic control planning. It is recommended in the report that there be established in the public works department a traffic engineering office, and that certain specific responsibilities in connection with traffic planning and adjustment be assigned to the director of the public works department.

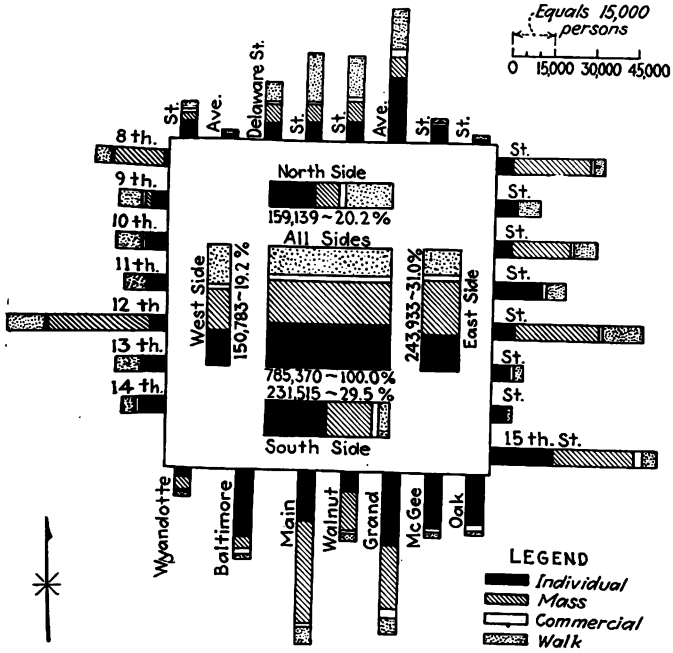
Efforts of the police department to provide adequate and efficient enforcement should receive the firm support of public opinion and of the courts. Better reporting

Digitized by Google

by patrolmen of traffic violations should be required. Courtesy cards or other mechanisms for extending special privileges to individuals or classes should never be used in the future. A reorganization of the traffic bureau in line with the proposed ordinance also is suggested.

Some Provisions of the Ordinance

The proposed traffic ordinance gives specific attention to traffic signs and signals and their display. The director of the public works department should be authorized to designate safety zones where deemed necessary to protect pedestrians and persons boarding and alighting from street cars. The ordinary sections prohibiting a vehicle passing a street car to the left or while a car



Mass transportation vehicles transport 35 per cent of the persons in and out of the central district of Kansas City and automobiles an equal number

is taking on or discharging passengers are included. Street cars are specifically given right-of-way, and vehicle drivers are required to leave the tracks upon signal. Driving of vehicles through safety zones is prohibited, and where vehicles are permitted to drive to the left of the zone they must not unnecessarily interfere with any street car about to stop.

Drastic provisions would prohibit parking at all times on certain designated streets in the central business district, from 7 a.m. to 6 p.m. in other locations, and from 7 to 9 a.m. and 4 :30 to 6 p.m. in still other places. These designated locations cover practically all of the business district.

Through streets are established to a greater extent than ever before and include nearly all of the street car routes. All vehicle drivers entering such through streets are required to make a complete stop before advancing beyond the property line.

Traffic Control of Utmost Importance

Street traffic is one of the most pressing physical problems confronting the community is the conclusion of the report, and the most certain and economical relief is to be found in carefully designed plans based on competent analysis. In conducting the work the committee and the staff were guided by two objectives: first, the maximum protection of citizens from injuries and death from street accidents; and, second, the maintenance of a reasonable facility of movement of all types of traffic in order that the city may obtain the greatest possible convenience of street use and that the commercial development of the community may be according to a pattern which is not distorted by lower accessibility resulting from congestion.

An attempt was made to give due consideration to the requirements and equities of the various classes of street users. Since pedestrian traffic makes up a large part of the total flow, primary attention was given to its requirements. Street car traffic is a second important factor. On this point the report states:

> Street car traffic is another highly important factor in traffic flow. This importance is derived partly from the fact that mass carriers perform a vital and basic service in community transportation and carry a substantial proportion of the personal movements within a city. Their importance is likewise partially derived from the fact that the operating characteristics of rail units differ materially from those of free-wheel traffic, and that due consideration must be given to these characteristics in the design of regulations, both for the purpose of facilitating street car movement and for the purpose of reducing the obstruction offered by street car operation to other types of traffic.

Automobile operation, the third important factor in traffic flow, represents the largest volume of movements, and, in its spectacular development in Kansas City as in other large cities, has tended to concentrate attention upon its special demands.

The purpose of sound traffic control engineering is the design of traffic regulatory methods which will make increases in volume of all types of traffic possible. Proper physical facilities, sound rules and regulations, adequate control mechanisms, correct education of the general public and firm enforcement of the traffic regulations are all necessary to reduce interference between the various classes of street users to a minimum.

Consideration in detail is given of present street traffic conditions in Kansas City. A city-wide study of traffic volume was conducted. In the central area all of the streets were found to be carriers of large volumes of traffic. Street car traffic was likewise studied and charted. Notwithstanding a constant and steady increase in population, it was found that there has been a general and gradual tendency toward a decline in the number of revenue passengers on mass transportation vehicles per annum, and a very substantial decline in the number of rides per inhabitant. This is stated to be on account of the tremendous increase in automobile registration. The report holds that it is entirely possible that the future will show a less rapid increase in the rate of automobile registration, and therefore in automobile use. It is more than likely, therefore, that, with population increments remaining relatively constant, the future will show a tendency toward a less rapid rate of decline in mass carrier transportation, and possibly an actual upturn of the curve.

On the subject of building heights in the central district, it is recognized that the problem of traffic congestion both within the district and along the arteries leading to it has reached a point of acuteness at the present time. With the development of larger-capacity structures in the central district in the future, these traffic and transportation demands will be materially increased. It is important, therefore, that control planning and the planning of physical facilities for the city be undertaken concurrently with the developments of these greater demands.

Digitized by Google

Methods used by individuals for reaching and leaving the central district were determined by making a cordon count along the lines of Eighth Street, Oak Street, Fifteenth Street and Wyandotte Street. A check was made of all persons entering and leaving by each street and by each means of transportation. From the cordon count it was possible to analyze the modes of transportation used and the proportion of the total flow carried by each agency.

Passenger automobiles accounted for 35.56 per cent of the total traffic, while the street car was next in importance, carrying 33.45 per cent. The proportion of walkers was unusually large, amounting to 23.67 per cent. This is held to be because of the proximity of densely inhabited residential areas. The total of the remaining movements is relatively light.

The number of passengers per automobile was found to run between 1.2 and 1.8, averaging slightly higher than in other communities, in which the average number of passengers per car ranges about 1.5.

From a comparison of the number of vehicles and the number of persons entering and leaving the business district it was found that, while the automobile carried 35 per cent of the number of people, it accounted for 78 per cent of the total vehicular movements. On the other hand, while the street car carried 33 per cent of the passenger movements in and out of the district it only contributed 4.98 per cent of the total vehicular movements. Street cars as well as the other mass carriers, including buses, are revealed as relatively economical users of street space, without consideration of their special operating requirements and characteristics. "It is obvious," states the report, "that the great problem of traffic control with respect to convenience and congestion must of necessity be centered upon a proper regulation of the activities of motor vehicles, inasmuch as these compose 78 per cent of the total number of units entering and leaving the central business district."

Two interesting charts in the report are those of the number of persons entering the business district and the number of vehicles. The comparison indicates on all of the important streets the predominance of automobile traffic in numbers of vehicles. Especial attention is called to Grand Avenue, which carries substantially the largest number of automobiles into and out of the district. The actual number of street cars using Grand Avenue is comparatively small, although more than half of the persons entering the district on this street do so by means of mass carriers.

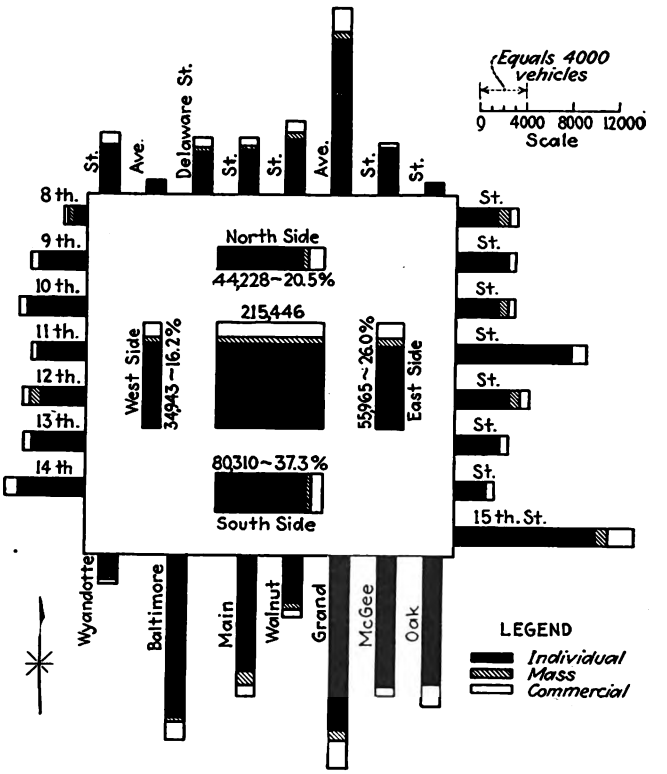
Lowered Accessibility Fosters Decentralization

While it is impossible to effect a complete decentralization of business in any large community without serious violation of economic requirements, yet a tendency toward such decentralization is precisely what is being fostered in every large American city by lowered accessibility resulting from street inconvenience and congestion. The evils of decentralization are not to be found in the logical and normal development of neighborhood business centers. Such centers serve a useful and proper purpose in the economic mechanism of the city, performing services primarily for those who live in the immediate vicinity. General facility of transportation between residential areas and the central business district is quite as important to the development of outlying business site values as it is for the central area.

To determine the trend of community development, a plot was made of all retail drug and grocery stores in the city. These were taken as typical in any neighborhood development. It was noted that the locations definitely followed the principal lines of traffic and transportation activity. The principal vehicular routes as well as the principal railway routes are great stimulators of business activity.

Effects of Mode of Transportation On Purchases

With the co-operation of the Kansas City Merchants' Association and its members, the investigation was extended to determine the relation between the number of purchases and related data with the mode of transportation used by the customer. During a single business day each customer in seventeen of the important retail establishments of the central district was interviewed by sales persons as to the mode of transportation used. The amount of each sale was recorded in relation to the transportation method. It was found that mass transportation, including street cars and buses, contributes almost 60 per cent of the number of purchases made. Total automobile traffic accounts for approximately 33 per cent. Walkers were relatively unimportant in the number of purchases made.



Private automobiles represent 78 per cent of the vehicle traffic in the central district and mass transportation vehicles only 5 per cent

When relative purchasing power is considered, it was found that street car and bus patrons contribute somewhat less than 40 per cent of the total sales volume. Automobile patrons contribute more than 50 per cent of the total value of purchases. As it might be expected, the average amount purchased varies greatly, the individual purchase of the customer arriving in a chauffeur-driven automobile being approximately three times that of the street car or bus rider. This is to be expected, since the street cars and buses carry workers in the central district who make purchases incidental to

Digitized by Google

their daily work, while those who are driven into the district by chauffeurs come for specific purposes, particularly for making large purchases.

Another survey was made to determine the time at which sales are made. The peak in number was found to be between 12 o'clock noon and 1 p.m. The late afternoon hour, from 5 to 5:30 p.m., showed a marked decline. This was believed to be because the time remaining after the offices closed was too short to attract persons making substantial purchases. The value of sales, however, did not follow this same trend, the maximum being reached between 2 and 3 p.m. This latter corresponded with the maximum number of persons checked into the store by actual count.

As a result of this survey it was recommended that the retail store hours be changed so that they will open at 9:30 a.m. and close at 6 p.m., instead of opening at 9 a.m. and closing at 5:30 p.m. This would not only remove the store employees from the mass transportation vehicles at the time when office workers are traveling, but would give office workers, leaving their places of business at 5 p.m., a full hour for shopping.

Study of automobile parking was given a great deal of consideration. Apart from loading and unloading and stopping of vehicles at the curb for a short time while persons are engaged in shopping or other business activities, the principal use of the parking space is by those who leave their automobiles all day or for a long period. On this point the report says:

> Need for facility of movement and maximum use of existing curb space leaves no legitimate place in the control scheme of any congested business district for long-time parking. It is a very low-grade use of valuable public property, every foot of which is required for maximum business activity. It is only equitable to both business concerns and to the general public to require that this type of parking be ruled from the streets and provided for in private facilities.

Actual measurements showed that, while all of the curb space in the central district would be sufficient for parking 8,900 more automobiles, deductions for fire hydrants, driveways, alleys, bus zones, safety zones and no parking areas leave only 4,315 spaces available for general parking during the business day. Within the same district there are off-street terminal facilities for 15,165 cars. Kansas City is thus in a more favorable position with respect to intown automobile terminals than any other city of comparable size for which figures are available.

Observations of all parked cars by half-hour periods during a normal business day resulted in checking 34,076 vehicles. The average parking time was one hour and two minutes making a total of 35,358 vehicle-hours. Of the vehicles, 26,621, or 78.12 per cent, parked one hour or less. Parking was found to build up rapidly in the morning. Until shortly after 8:20 a.m. the parking load exceeds the legal capacity. From 9 a.m. to 5 p.m., however, the load of parking never exceeds the maximum legal limit and indeed falls substantially below. The surplus of curb space revealed during the hours of the business day is in the lighter business streets, while in typical blocks in the more dense traffic area there is an almost constant overload of parking during all hours. An analysis of the parked vehicles showed that almost 10,000 were parked where parking is prohibited. Since prohibited parking is the easiest of all regulations to enforce, this indicates a definite laxity in enforcement policy. Violation of time limit accounts for the second largest class of parking violators, more than 4,000 vehicles being so checked.

Major Transportation Methods of Customers Compared

City	Per Cent of Total Number of Customers Recorded		
	Public Carriers	Walkers	Automobiles
Kansas City	60.41	5.88	33.71
Washington	57.23	11.22	31.55
Chicago	72.50	19.50*	8.00
San Francisco	60.20	21.80*	18.50
Boston	62.00	23.70*	14.30

*Including those walking from suburban trains.

The remainder of the report is devoted to special regulations proposed. An immediate expansion of the central district signal system is recommended to meet the urgent requirements in the areas adjacent to the territory covered by the present installation. Traffic signs and traffic markings are proposed to make it easier to follow the regulations.

With regard to street car operation it is pointed out that numerous operating difficulties and obstructions come from the necessity to run on fixed tracks. When the tracks are occupied by other traffic it is found impossible to proceed, making not only a handicap to street car operation, but an equal handicap in automobile operation. Hence, it is desirable that a minimum obstruction be offered along street car tracks. Accordingly, it is recommended that the practice now followed in the present ordinance of requiring the removal of vehicles from street car tracks upon suitable signal be continued.

Another means of expediting street car traffic is extension of the system of limited stops recently installed on several lines. The elimination of 291 stops in Kansas City has served to increase average speed on the lines affected by 23.1 per cent.

It is estimated that an extension of the limited stop plan to a number of lines indicated will give an average improvement of 28.2 per cent in street car speed and will greatly reduce interference between street cars and other traffic. Some part of the improved railway speed can undoubtedly be attributed to the introduction of the arterial stop plan along many lines.

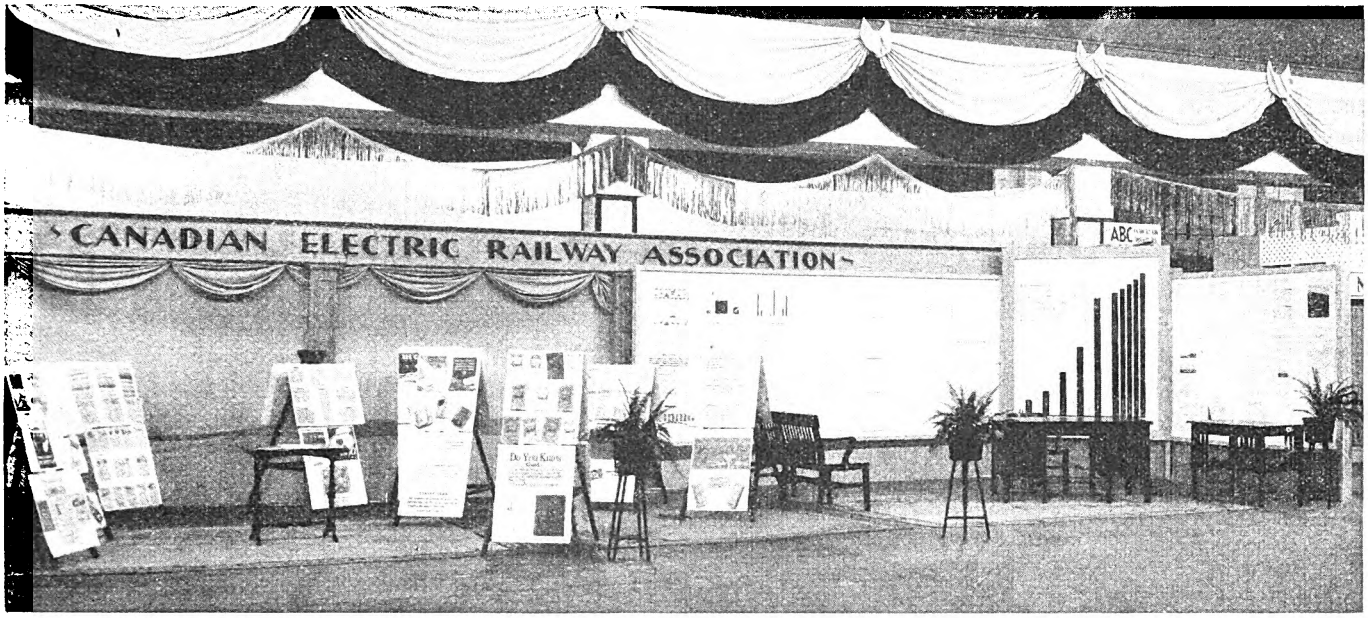
Cement Specifications Revised

REVISIONS in the standard specifications and tests for portland cement have been adopted by the American Society for Testing Materials. Eleven items in all were included in the revision, of which nine were concerned with tolerances for testing apparatus.

Strength requirements now include the average tensile strength at seven days for the three standard mortar briquets from a minimum of 225 lb. per sq.in. to 275 lb. per sq.in., and the average tensile strength requirement at 28 days from a minimum of 325 lb. per sq.in. to 350 lb. per sq.in. These revisions in strength requirements will bring the minimum values more in line with the general strength level maintained by portland cement plants throughout the country.

Specifications for high early strength portland cement were accepted for publication as tentative. These are the same as the newly revised specifications for portland cement, except that a maximum sulphuric anhydride content of 2.5 per cent instead of 2 per cent is permitted and that tensile strength requirements shall be 275 lb. per sq.in. at one day, and 375 lb. per sq.in. at three days. In addition, the purchaser has the option to require a test at 28 days, in which case the average tensile strength obtained shall be higher than the strength at three days.

Digitized by Google



Statistical information and publicity data were effectively displayed in the association booth

Successful Canadian Convention

Held at Ottawa

Trolley buses and fare structures were among principal subjects of discussions. Approximately 400 members and guests in attendance

LIVELY interest in ways to improve transportation service was shown by the members of the Canadian Electric Railway Association at their 26th annual convention held at Ottawa, Sept. 17-19, 1930. At three business sessions presided over by the president, C. H. Dahl, vice-president in charge of operations, Winnipeg Electric Company, a well-balanced program was presented covering practically all phases of railway operation. Following the morning sessions, luncheon meetings were held at which prominent speakers spoke on a variety of interesting topics. The business sessions as well as the luncheons were held in the Automobile Building in Lansdowne Park where manufacturer members had arranged an excellent exhibit of equipment and materials.

In his opening address, Mr. Dahl stressed the necessity for placing the railway's problems before the public. He felt that merchandising practices had not kept pace with the accomplishments in improving service, and urged further efforts on the part of the member companies in perfecting their merchandising programs so that the public will understand the necessity for fare revisions and relief from obsolete franchise agreements. The wide variation in the taxes paid by the different companies, according to Mr. Dahl, shows that effective work along this line has been done by some and neglected by others. Mr. Dahl recommended, for careful study, the report of the committee on publicity and merchandising of transportation.

The greater part of the first session was given over to the reports of committees. The committee on rail corrugation reported that the results of experiments made during the year confirmed its previous investigations. It was recommended that all departments of the tramway companies be encouraged to study and improve wherever possible their engineering practice in the design and maintenance of rolling stock and track. Member companies were urged to continue to install trial lots of intermediate manganese or other low-alloy or heat-treated rails, doing everything possible to encourage co-operation on the part of the rail manufacturers in the matter of improved steel making practice and increased heat-treating facilities. Also, the committee asked that all experimental work and trial lots of rail be followed up during installation and service with scrupulous attention to details and the keeping of complete records.

The committee on motor buses and trucks discussed

Digitized by Google

the general use of the bus in city and intercity service, and especially pointed out the value of developing special or chartered business. The committee recommended that efforts be made to establish interline ticket sales and co-ordinated schedules.

The committee on publicity and merchandising of transportation, in its report, emphasized the growing need for merchandising of street railway service. An outline on this wide subject on which individual studies may be based and an extensive bibliography with references to A.E.R.A. reports and technical press articles were submitted.

Deviating from the methods used in the past, the committee on safety and accident prevention during this year centered its efforts in obtaining reports from association members and from companies operating in the United States on definite safety practices which had been tried and proved successful. These reports were summarized and presented to the industry in eighteen letters.

Much Interest Shown in Trolley Bus

The second session of the convention was largely devoted to a study of the trolley bus. E. A. West, general manager, Utah Light & Traction Company, Salt Lake City, presented a paper on this subject in which he gave a résumé of his company's experience during the past two years and prophesied a greater use of trolley buses in the future. He presented information on the problems in equipment and maintenance which were experienced with the original vehicles, showing where the greatest percentages of maintenance costs had been spent. His comparison of costs between trolley bus and street car and gas bus operations was particularly interesting. Dividing them into major cost items, he showed how they were effected or eliminated as follows:

Way and structure costs are eliminated entirely. The overhead system costs should amount to no more than twice the cost of maintaining a railway street car overhead system. Because of the light weight and simple construction of the trolley bus, equipment costs, exclusive of tire costs, will not run over three-fourths those of street railway cars. Conducting transportation will be less expensive than for street railway operation due to the higher average speeds attainable with electric coaches. Power costs should be about one-half those for street railway cars, and less than gasoline costs. The latter are usually higher than street car power costs with only two-thirds the seating capacity of an average street railway car. Trolley buses have seating capacities the same as average-sized street railway cars. Injuries and damage costs will be lower due to greater maneuverability, etc. Gross charges to the depreciation account will be lower on account of the smaller investment.

In general, Mr. West stated that operating experience for two years has shown that the operating costs of trolley buses are about 75 per cent as much as those of a street railway car of the same capacity and 65 per cent that of the equivalent carrying capacity in gasoline buses. The interest aroused by the discussion on this subject showed clearly the serious consideration this vehicle is receiving in Canada.

A paper on street railway fares was presented at the Friday morning session by Prof. Albert S. Richey, electric railway engineer. The speaker discussed the fare situation as it exists in the United States, giving a number of examples of different fare structures and methods of collection. He described the flat-rate fare, the wholesale plan—carrying the regular rider at a less price than the occasional—and the zone system. Discussing what he considers a possibly ideal fare structure, Professor Richey defined it as a charge to each rider closely proportionate to the cost of his ride. He stated, "It costs more to carry the occasional rider than the regular rider. Certainly it costs more to carry a passenger 5 miles than to carry him five blocks. It costs more to carry him any distance in the rush hours than the same distance in the normal hours. These costs are capable of fairly exact determination, and an ideal fare structure might be worked out including a ready-to-serve charge of say 2, 3, or 5 cents with a service or mileage charge of, say, 1 or 2 cents for each additional unit of distance ridden. The ready-to-serve charge might vary with the time of day and with the regularity with which the rider uses the service, while the mileage charge also might vary as indicated by cost analyses, or remain with a fixed relation to distance traveled in fare collection requirements so dictated." To make such a fare structure workable, Professor Richey pointed out that it is necessary to "determine the fare properly due from each passenger, to enable that fare to be collected without delay to the service and properly to audit the collection."

The open discussion on the subject of fares brought out many interesting opinions on a number of experimental fares. J. B. Hayes, manager Nova Scotia Light & Power Company, and Mr. Dahl discussed the weekly pass as used in Halifax and elsewhere. Ralph Emerson, vice-president Cleveland Railway, told of the results of the 2-cent zone experiment in Cleveland and H. E. Weyman, vice-president and general manager Levis Tramways, gave the results of a number of fare changes tried on his system. Walter Jackson, consultant on street car and bus fares, Mount Vernon, New York, also discussed weekly passes and permits.

Under the general headings of traffic, fire protection, operation, and maintenance, a number of scheduled "Timely Topics" were discussed during the sessions. At the first meeting, the subject of the effect of traffic lights on street car operation was introduced by D. E. Blair, general superintendent Montreal Tramways, and discussed by W. S. Irvin, traffic study engineer Toronto Transportation Commission. The need for engineering study, the best available equipment and the careful supervision of the operation of the signal system by a traffic engineer, were stressed by Mr. Blair. Mr. Irvin described the experiences with different signal systems in Toronto. He warned against too many lights in a system, stating that a standard should be set up to justify a signal at any particular intersection. As a result of this discussion on traffic, L. Tait, manager and secretary-treasurer London Street Railway, London, Ontario, moved that a committee be formed to gather data on signal systems and equipment. The motion was passed and a committee appointed at a meeting of the new executive committee on the following day.

Methods used to reduce fire hazards and decrease insurance premiums was the topic discussed at the second session by J. P. L. Ryan, engineer and rating expert Johnston & Higgins, Ltd., and W. E. P. Duncan, engineer of structures, Toronto Transportation Commission. At this meeting, A. M. Lindsay, superintendent of rolling stock Montreal Tramways, described the operating features of cars recently purchased by Canadian electric railways.

Welding, as applied to track maintenance and bus

Digitized by Google

inspection methods, were the topic discussed at the third session. W. A. McRae, engineer of way Toronto Transportation Commission, and J. T. McCarty, manager Metal & Thermit Corporation, led the discussion on welding. H. R. Holder, superintendent of auto bus department Montreal Tramways, discussed bus maintenance.

Luncheon Meetings Popular

At the first luncheon meeting Charles Gordon, managing director American Electric Railway Association, was the principal speaker. He directed the thoughts of the members to the important economic part that the railways play in a community, and showed how the successful operation of mass transportation affected property values, growth of business and the general well-being of the district served. Mr. Gordon dwelt on the traffic congestion problem and pointed out that its solution should be one of the fundamental considerations of a public transportation facility. "Movement of people, not vehicles," said Mr. Gordon, "must be uppermost in the minds of those attempting to solve the traffic problem in any city."

Hon. T. Ahearn, P.C., president Ottawa Electric Railway, was the speaker at the second luncheon. He gave an interesting history of the development of the Ottawa Electric Railway from the days of the horse car up to the present time. He told how, in the face of almost incredible difficulties, the first electric service was carried on during the first winter under very severe weather conditions.

At the conclusion of Mr. Ahearn's address, John A. Miller, Jr., editor Electric Railway Journal, presented to Mr. Ahearn a certificate of merit won by the department of rolling stock and shops of the Ottawa Electric Railway. Announcement of this award is made elsewhere in this issue.

The street car and individual automobile service was the subject of a talk by T. Fitzgerald, vice-president and general manager Pittsburgh Railways, at the third luncheon. He showed how the popular acceptance of the automobile, the development and construction of highways and the growth of other forms of individual transportation facilities had affected street car operations in the United States. He urged the railways to realize that these modes of transportation were here to stay and that the future of the electric railways depended on rendering service which approached the automobile in speed, comfort and convenience.

At the last business session of the convention, the following men were elected to serve as officers for the coming year:

Honorary President—Hon. T. Ahearn, P.C., president Ottawa Electric Railway.

Honorary Vice-President—Acton Burrows, proprietor *Canadian Railway and Marine World.*

Honorary Advisory Council—Edward Anderson, K.C., president and general manager Winnipeg Electric Company;

Lieut.-Col. J. E. Hutcheson, vice-president and managing director Montreal Tramways;

Charles A. Magrath, chairman Hydro-Electric Power Company of Ontario;

W. G. Murrin, M.I.E.E., president British Columbia Electric Railway;

J. F. Saint-Cyr, chairman Montreal Tramways Commission;

Julian C. Smith, LL.D., M.E., president Montreal Tramways.

President—L. Tait, manager and secretary-treasurer London Street Railway.

Vice-President—George E. Waller, vice-president and manager of transportation Dominion Power & Transmission Company.

Treasurer—H. C. Patten, comptroller Toronto Transportation Commission.

Auditor—J. E. Richards, manager and treasurer London & Port Stanley Railway.

Executive Committee—The president, vice-president, treasurer, immediate past-president (C. H. Dahl, vice-president in charge of operation Winnipeg Electric Company), and:

D. E. Blair, general superintendent Montreal Tramways;

Maj. F. D. Burpee, vice-president and manager Ottawa Electric Railway;

W. J. Cunningham, superintendent Edmonton Radial Railway;

A. V. Gale, general manager, Hull Electric Company;

W. S. Hart, vice-president Three Rivers Traction Company, and treasurer Quebec Railway, Light & Power Company;

D. W. Harvey, general manager Toronto Transportation Commission;

C. J. Moors, manager Fort Williams Electric Railway;

W. R. Robertson, general superintendent Ontario Hydro-Electric Railways;

K. B. Thornton, general manager, Montreal Tramways;

H. E. Weyman, vice-president and general manager Levis Tramways.

LEONARD TAIT

New President Canadian Electric Railway Association

LEONARD TAIT, the new president of the Canadian Electric Railway Association began railway work in 1899 as a clerk with the Michigan Central Railroad, at London. He also served with the Grand Trunk Railroad and the Canadian Pacific Railroad, and returned to the Michigan Central Railroad in February, 1905, as chief clerk to the freight and passenger agent, London. He was appointed freight agent of the New York Central Railroad at Toronto, and in November, 1912, became secretary-treasurer of the London & Lake Erie Railway. In 1917 he became secretary and treasurer of the London Street Railway, which position he held until October, 1924, when he became manager and secretary-treasurer.

The afternoons of each day were given over to the inspection of the exhibits. Leading Canadian manufacturers as well as a number of American manufacturers were represented.

Following the luncheon on Friday a meeting of the new executive committee was held. It was decided to continue committee activity during the coming year along substantially the same lines as during the year just ended, with the exception that a new committee was created to study the subject of traffic control. The personnel of the committees was also decided. Considerable discussion occurred concerning the best date and location for the association's 1931 convention. It was decided, however, that the final decision on this subject should be deferred for the time being.

Many entertainment features were enjoyed by the delegates. A cabaret dinner followed by dancing was given at the Chateau Laurier on Wednesday evening, and on Thursday evening the grand ball was held. On each day, entertainment was planned for the ladies of the party. On Wednesday a bridge tournament was held in the drawing room of the hotel, on Thursday a sightseeing motor coach tour to points of interest in the Ottawa district was made and on Friday a golf tournament was arranged.

Digitized by Google

Canadian Properties Continue Excellent Record

STATISTICS of the electric railway industry in Canada, which have been collected and published by the Canadian Electric Railway Association, have been issued for the fourth successive year by the secretary, Eustace Smith, Jr. In the main they follow the form used last year, and abstracted in this paper for November, 1929, page 1049.

Growth of the industry continued through the year 1929, the passenger revenue having increased more than $2,000,000 from 1928, and reaching a high point for the Dominion. The growth from 1900 is given in Table I. Passenger revenue per mile of single track is now 2.58 times as great as it was in 1900, but the trend of operating expenses per track-mile is 3.07 times as great. However, the operating expenses per mile of single track decreased last year for the first time since the post-war peak in 1920. The use of one-man cars has been an important factor in that movement.

For the past several years there has been an improvement in the financial situation of the Canadian companies. While deductions from income have grown steadily the reduction in operating expenses has made it possible to meet all obligations. In 1921 only 19.5 per cent of the total revenue was available to pay interest and dividends; in 1928 the amount available was 33.33 per cent, as against 32.96 per cent in 1927. Wages, however, continue upward, being 98.6 per cent higher last year than in 1913 and nearly 3 per cent higher than in 1928. The rise is nearly twice as great as the increases shown in fares and living costs.

During 1929 the automobile registrations in Canada continued to increase, reaching a total of 1,193,889. This was 133,000 more than in the preceding year, and represents the greatest growth in any single year recorded. The growth in registrations has been fairly steady from 50,000 vehicles in 1913.

The number of revenue passengers continued approximately the same until the end of the war, with a sharp increase to a maximum of 804,711,333 in 1920. Subsequently there was a decline and the top figure was not exceeded until 1928. Last year, however, there was another marked increase to 3.25 per cent above the 1920 peak, making the largest number of street railway passengers ever carried in Canada. In the face of the large increase in automobile registrations in the past four years this showing is considered particularly encouraging.

There has been a remarkable development of the motor bus in Canadian transportation, according to the report. In the figures it is possible to distinguish between feeder buses and special coaches used for interurban work, special fare routes, charter and sightseeing service. From 13 buses operated by electric railways in Canada in 1921 the total has grown to 540 in 1929. The growth is particularly marked in the last four years. In 1929 the number of coaches was 264, an increase of 18 per cent, and the number of feeder buses was 276, an increase of 4 per cent, over the preceding year.

There has been a distinct trend toward the absorption of independent bus lines by the electric railways. Many of these lines running on suburban and interurban routes have been carrying passengers to the centers of the cities and depriving the street railways of their passengers and revenue, according to the report. During the past two years electric railways have purchased the larger and more important independent bus lines directly or indirectly in competition.

As to the comparative efficiencies of passenger vehicles in mass transportation, traffic counts in a typical Canadian city are cited. During the evening rush hour on normal week days in February, 1930, street cars comprised 8.1 per cent of all passenger vehicle movements and 5.08 per cent of all traffic movements, carrying 78.8 per cent of all passenger traffic and occupying 24.1 per cent of the street space taken up by all passenger vehicles. Buses comprised 0.7 per cent of all passenger vehicle movements, carried 1.3 per cent of all passengers and occupied 1.4 per cent of the street space taken up by all passenger vehicles. Automobiles comprised 91.2 per cent of all passenger vehicle movements, carried 19.9 per cent of all passenger traffic and occupied 74.5 per cent of all street space taken up by all passenger vehicles.

During the hour in question there were 466 outbound motor street cars and 200 trailers carrying 57,265 passengers, or an average of 86 passengers per car. In the same period there were 7,486 automobiles carrying 14,422 passengers, or an average of 1.93 passengers per car. It would, therefore, require 45 automobiles to carry the same number as the average street car.

Financial and operating statistics of Canadian electric railways for the years 1922-1929 compiled by the Dominion Bureau of Statistics are given in Table II.

Table I—Canadian Electric Railway Passenger Revenues, 1900-1929

Compiled by Canadian Electric Railway Association

Year	Passenger Revenue: Total	Passenger Revenue: Per Single-track Mile	Passenger Revenue: Trend	Operating Expense: Per Single-track Mile	Operating Expense: Trend
1900	$5,529,687	$8,192	100	$5,237	100
1905	8,932,914	11,265	138	7,463	141
1910	16,125,994	11,660	143	7,319	140
1915	25,579,689	12,211	150	8,622	165
1920	43,279,009	17,832	218	15,757	300
1925	45,185,402	17,616	216	13,811	264
1926	46,810,403	18,516	227	14,414	275
1927	48,289,774	19,521	239	15,046	286
1928	50,164,164	20,050	244	16,438	314
1929	52,302,474	21,107	258	16,102	307

Table II—Statistics of Canadian Electric Railways, 1922-1929

Compiled by the Dominion Bureau of Statistics

	Capitalization: Stocks	Capitalization: Bonds, etc.	Capitalization: Total	Operating Revenues and Expenses: Gross	Operating Revenues and Expenses: Expenses	Operating Revenues and Expenses: Net
1922	$76,949,185	$111,309,789	$188,258,974	$49,660,485	$35,986,872	$13,673,613
1923	76,674,185	122,395,685	199,069,870	50,191,387	36,171,923	14,019,464
1924	76,482,085	137,285,575	213,767,660	49,439,559	36,125,213	13,314,346
1925	58,567,242	163,201,978	221,769,220	49,626,231	35,426,487	14,199,744
1926	57,779,518	158,029,002	215,808,520	51,723,199	36,453,709	15,269,490
1927	58,873,778	163,678,939	222,552,717	53,506,401	37,616,568	15,889,833
1928	50,653,072	170,649,165	221,302,237	55,632,761	38,782,719	16,850,042
1929	54,453,321	167,969,494	222,422,815	58,268,980	40,085,140	18,183,840

	Miles of Track Operated: First	Miles of Track Operated: Second	Miles of Track Operated: Total	Passengers Carried	Tons of Freight	Passenger Car-Miles	Employees	Salaries and Wages
1922	1,725	513	2,238	738,908,949	2,445,425	113,403,912	18,099	$24,988,118
1923	1,736	511	2,247	737,282,038	3,145,803	115,768,713	17,779	25,039,286
1924	1,737	525	2,262	726,497,729	2,546,928	116,438,733	17,379	24,964,440
1925	1,738	543	2,280	725,491,101	2,706,312	115,715,733	16,933	24,543,855
1926	1,684	553	2,237	748,710,836	3,493,457	118,566,321	16,961	24,686,549
1927	1,652	563	2,215	781,398,194	3,269,024	127,062,864	18,090	25,891,020
1928	1,653	566	2,219	808,023,615	3,892,114	128,888,905	18,697	26,494,062
1929	1,637	563	2,202	836,729,851	3,662,765	134,666,564	18,801	26,984,061

Digitized by Google

By J. ROWLAND BIBBINS
Consulting Engineer
Washington, D. C.

Short Signal Cycles

Speed Traffic and Reduce Accidents

A study of pedestrian psychology in relation to traffic and transportation shows that long cycles will not be observed by all walkers

REDUCTION by one-quarter or one-half of the hazard of pedestrians crossing traffic and transit streets, through the application of design and the intangible factor of human psychology alone, seems worthy of serious consideration by those using and controlling our streets. Mechanical methods and automatic devices often neglect this factor. In the pages of the JOURNAL have been discussed, from time to time, the theory, practice and results of signaling, both good and bad, and their ultimate effect on transportation speed, traffic congestion and pedestrian safety.

Some transportation men, struggling to maintain reasonable speed through the heavy traffic districts, are disposed to let the pedestrian take care of himself, forgetting that all those who use public transportation are pedestrians at some stage of their journey, especially in the signaled zones. On the other hand, most traffic officials succumb to the pressure of unadvised local public opinion, demanding "better pedestrian protection," and as a result, usually impose unnecessary restrictions under which both transportation and traffic fare badly, indeed. Few of these officials seek data to determine the proper balance, and rarely do they take the trouble to ascertain either the dynamics or psychology of the problem.

The whole question was brought to focus by the writer in a recent signal survey under the most severe metropolitan conditions where transit speeds had been brought down to 4 m.p.h. by improper signal control. Here the traffic authority arbitrarily demanded that traffic controls and signal timing should provide sufficient time for the slowest walker to meander across the street from curb to curb, 100 ft. In this survey the normal habits of some 60,000 pedestrians in crossing the streets were timed by stop watch. Fig. 1 shows the results. Taking the group as a whole, the weighted average walking time to cross the 100-ft. street was 20.5 seconds or 4.86 ft. per second (3.3 m.p.h.). Of this total, the "actives" represented 84 per cent; males averaged 5.3 ft. per second (3.6 m.p.h.); the women 4.6 ft. per second (3.1 m.p.h.). The "inactives," men, women and children, 14 per cent of the total, varied between 20 and 24 seconds crossing time, averaging 4.4 ft. per second, (3 m.p.h.). The last class, "slows," very old men and women, cripples and nurse maids strolling across with baby carriages, representing about 2 per cent of the total, took from 25 to 31 seconds, averaging 3.6 ft. per second (2.4 m.p.h.).

The signal system allowed two minutes in the direction of heaviest traffic and one minute for cross traffic. In the center of one of the thoroughfares was a grassed parking strip with fencing, offering perfect pedestrian protection. All "slows" and "inactives" could use it for half-crossings. Despite this, the traffic authority rejected any signal design that would not provide at least 35 seconds cross time at any point, corresponding to a walking speed of only 2.9 ft. per second (1.95 m.p.h.). This interval is three-quarters greater than for the "average" and nearly one-half greater than the time required by "inactives."

The question is, then, what is the fair basis for minimum pedestrian time? And should the signal system be designed for protecting the 98 per cent of active people or the 2 per cent "slows" who always have the protection of the central refuge zones, where they can fall back of the procession with full safety?

This difference between the possibility of half-crossings vs. full-crossings is really the difference between an efficient and an extremely inefficient signal design. The former can produce reasonable non-stop "progressive" traffic movement with very little wastage of crossing time; the latter must involve great time wastage. In practice this always appears as so-called congestion, which is really not congestion at all but unnecessary stoppage.

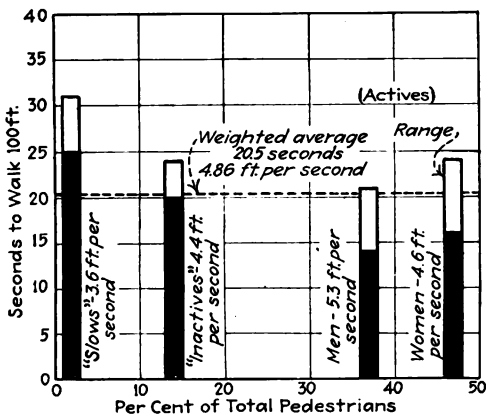


Fig. 1—How long it takes to cross a 100-ft. street was determined from a count of 60,000 pedestrians

The effect of human psychology is very definitely illustrated in this survey. Traffic authorities have imposed on traffic and transportation absolutely rigid restrictions, but enforce none whatever upon pedestrians. In the great city of New York all main traffic is stopped one minute out of every three minutes, or 33 per cent of the time; cross streets just the reverse—all traffic stops two minutes out of every three minutes, or 66 per cent of the time.* The same situation obtains on Michigan

*Within the last few weeks the signal cycle in New York has been shortened to two minutes, consisting of 85 seconds north-and-south and 25 seconds east-and-west, with 5-second stop periods between.

Digitized by Google

Boulevard, Chicago. All traffic on the north side of the river stops every 100 seconds for 35 per cent of the time; on the south side of the river, traffic stops every 150 seconds for 40 per cent of the time.

And what about the pedestrian himself—his habits, his appreciation of these rigid police requirements imposed upon all traffic, and, of course, all car-bus riders, who form the major volume in daily population movement? Do pedestrians obey these restrictions equally or are they even required to do so by city ordinance and street police enforcement? The answer is well indicated in Fig. 2. Here are analyzed the habits of these 60,000 pedestrians crossing two important streets, one a main high-speed artery and the other a heavy crosstown thoroughfare. The survey recorded in detail two groups. The first obey the signals, crossing only on green. The remainder violate the red "Stop" signal, which traffic

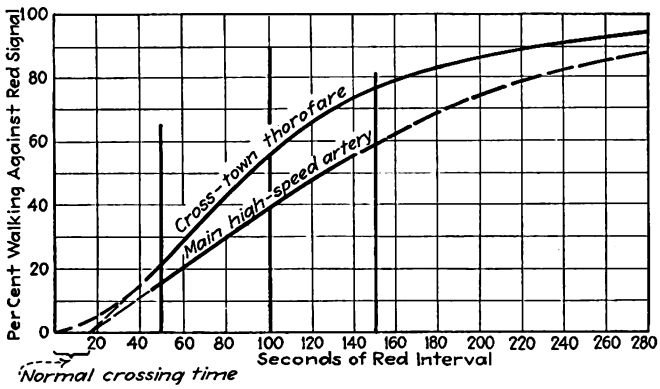


Fig. 2—Violations of the red signals by pedestrians go down as the cycle length is reduced

and transit have to observe for their protection. This expresses the hazard factor. This group is plotted with relation to per cent volume and the length of the red interval.

The disturbing fact appears from this study that the large majority of pedestrians, two-thirds in fact, violated the red signal and deliberately crossed through traffic without waiting for the green, and even without making use of the refuge zones provided for their further protection. The curve "Percentage of Violations" is based upon two main series of timed crossing intervals, one minute and two minutes respectively. Its necessary relation to the origin on the one hand, and on the other the known fact that with still longer signals everyone would finally cross against the red, renders the extrapolation of the curve fairly accurate. While about two-thirds of the pedestrians actually crossed against the long red signal, only a little over one-quarter walked against the short red. As the cycle is shortened, the proportion of violations decreases at even faster rate than the interval itself.

This is the key to the signal situation on all wide thoroughfares. Carrying forward this analysis, in Fig. 3, the "Hazard Curve" per second of red interval is the first derivative of the basic curve of "Percentage Violations." As the cycle is shortened, it is clear that the pedestrian hazard also falls much faster than the proportion of violations. Indications are that with a 20-second red interval, the hazard would be perhaps only half of that for a 30-second red interval, the latter only about a third of that for a 60-second red interval, etc. The writer believes that further investigation should be undertaken, particularly of shorter intervals, at a given crossing where different red and green intervals can be obtained through a wide range. Comparing one street with another is not fundamentally accurate and is liable to give variable and obscure results.

From the preceding it seems to the writer that we must entirely revise our ideas as to protection of pedestrians when they neglect their own interests so far as indicated in this study. It is equally obvious that those traffic authorities who still adhere rigidly and blindly to the old long cycles are defeating their own objective in

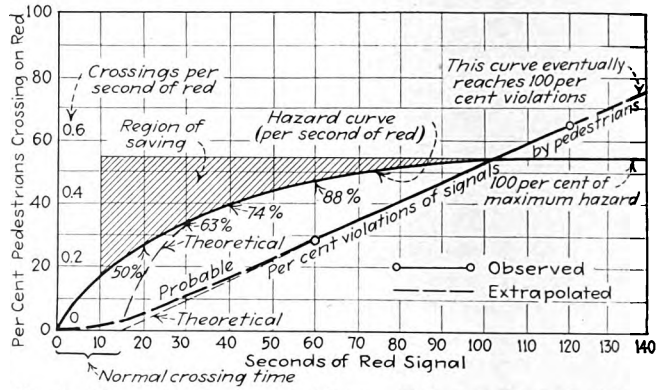


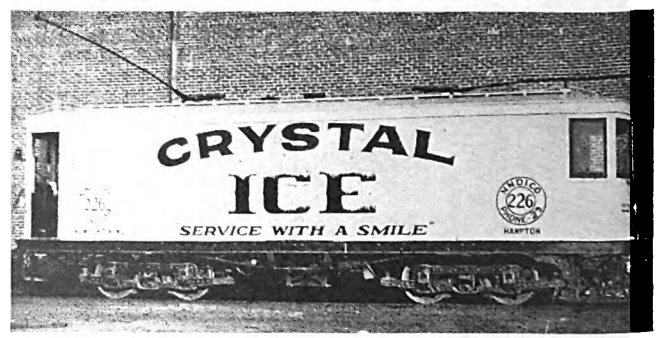
Fig. 3—Short signals save accidents. This was determined by a study of 46,000 observations on a major crosstown thoroughfare

best serving the public, not only increasing pedestrian accidents, but causing a tremendous delay to all.

The flexible progressive signal system can be designed to abate or remove these hardships. With reasonable crossing intervals, it is safe to say that our signal systems can be vastly improved, somewhere near in proportion to the improvement in efficiency which the public demands of modern transportation. As a basic approach to this re-design of signals, the writer would suggest that a "normal" crossing time of roadways of 4.5 ft. per second (about 3 m.p.h.) should be used. Furthermore, that very wide thoroughfares, if they are ever to be signaled with any degree of efficiency, must have center refuge zones permitting half-crossings where reasonably needed.

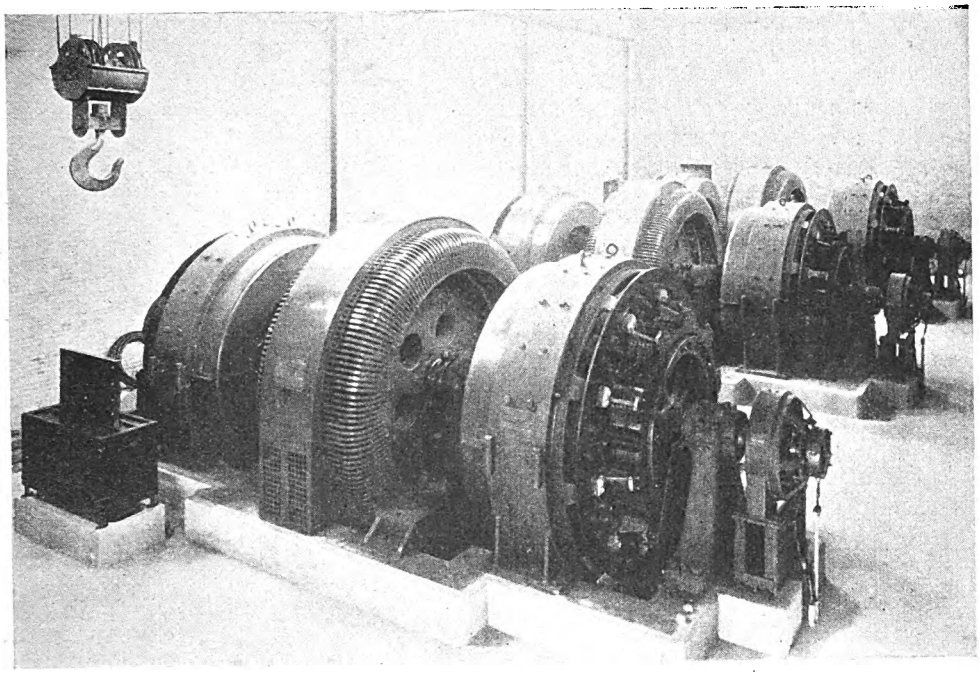
This question of the pedestrian walking time, and his psychology in refusing to conform to the same rigid regulations required of traffic and transit lies at the bottom of the problem. However, American citizens are independent-minded, but amendable to reason and cause. Where armies of policemen are relatively powerless, a little psychology will succeed at practically no cost.

Ice Cars Advertise Product of Railway Subsidiary



Cars operated by the Virginia Public Service Company in a co-operative freight service with its subsidiary, the Newport News Distilled Ice Company, are used to stimulate the latter's business by attractive advertising

Digitized by Google



One substation contains three 3,000-kw., 3,000-volt synchronous motor-generator sets, each with high-speed circuit-breaker protection. The other substation is similar but only two sets are installed at present

Motor Generators

Supply Power for Cleveland Terminal Electrification

Two substations, one at each end of the system, furnish direct current at 3,000 volts for operation of trains on this heavy electrified system. Complete automatic protection is afforded for all circuits and machines

By
G. R. McDONALD
Transportation Engineering Department
General Electric Company

POWER for the 3,000-volt direct-current overhead contact system of the Cleveland Union Terminals Company is supplied by two synchronous motor-generator substations located approximately 8 miles apart. One station, near the western, or Linndale, end contains three 3,000-kw. units. The other station, about 7 miles east of the terminal, has an initial equipment of two similar units, with an ultimate capacity of three units. The buildings are practically identical, having inside dimensions on the ground floor level of 84 ft. x 83 ft. 8 in. The buildings are divided into three sections, with the main motor-generator room in the center, the alternating-current incoming lines and switching equipment at one side, and the main switchboard and direct-current switching equipment on the other. Ample headroom in the main machine room provides ventilation and the necessary space for an electric crane.

The incoming, or a.c., side of the building is completely walled off from the central machine room. The main switchboard on the other side of the building and the gallery directly above the main switchboard are open to the machine floor. At the Linndale station, the incoming a.c. lines from the Cleveland Electric Illuminating Company enter through six lines of underground cable, which come up to the main floor level through six incoming line breakers and thence to the two bus tie breakers. This bus, located in the basement, is in three sections, each fed by two of the incoming lines. The two tie breakers are so arranged that sections 1 and 2, or 2 and 3, may be connected. The main-line machine breaker and station service breakers are also located in the basement. The arrangement of the east substation is similar, except that the present installation includes only four incoming cable lines. All of the a.c. breakers, with the exception of the starting and running units for the machine, are designed for 15,000 volts and a normal capacity of

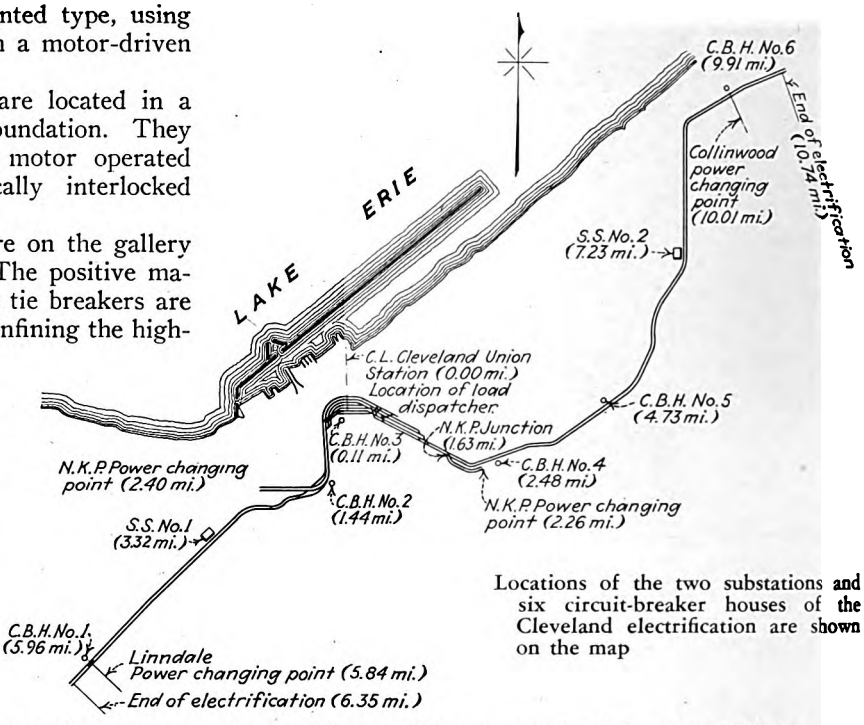
Digitized by Google

1,200 amp. They are of the cell-mounted type, using three separate tanks, and provided with a motor-driven closing mechanism.

The starting and running breakers are located in a cell structure adjacent to the machine foundation. They are also of the three-tank type with motor operated mechanism, electrically and mechanically interlocked against simultaneous operation.

The main and auxiliary d.c. buses are on the gallery directly above the main switchboard. The positive machine breakers, feeder breakers and bus tie breakers are all mounted on the bus structure, thus confining the high-voltage d.c. switching to the gallery.

As a further precaution, all of the relays and other devices used directly on the 3,000-volt circuit except the voltmeters are segregated from the rest of the control and located on a panel in the gallery. The negative machine breakers are mounted adjacent to their respective machines on the main floor. All of the d.c. switching is done by high-speed circuit breakers.



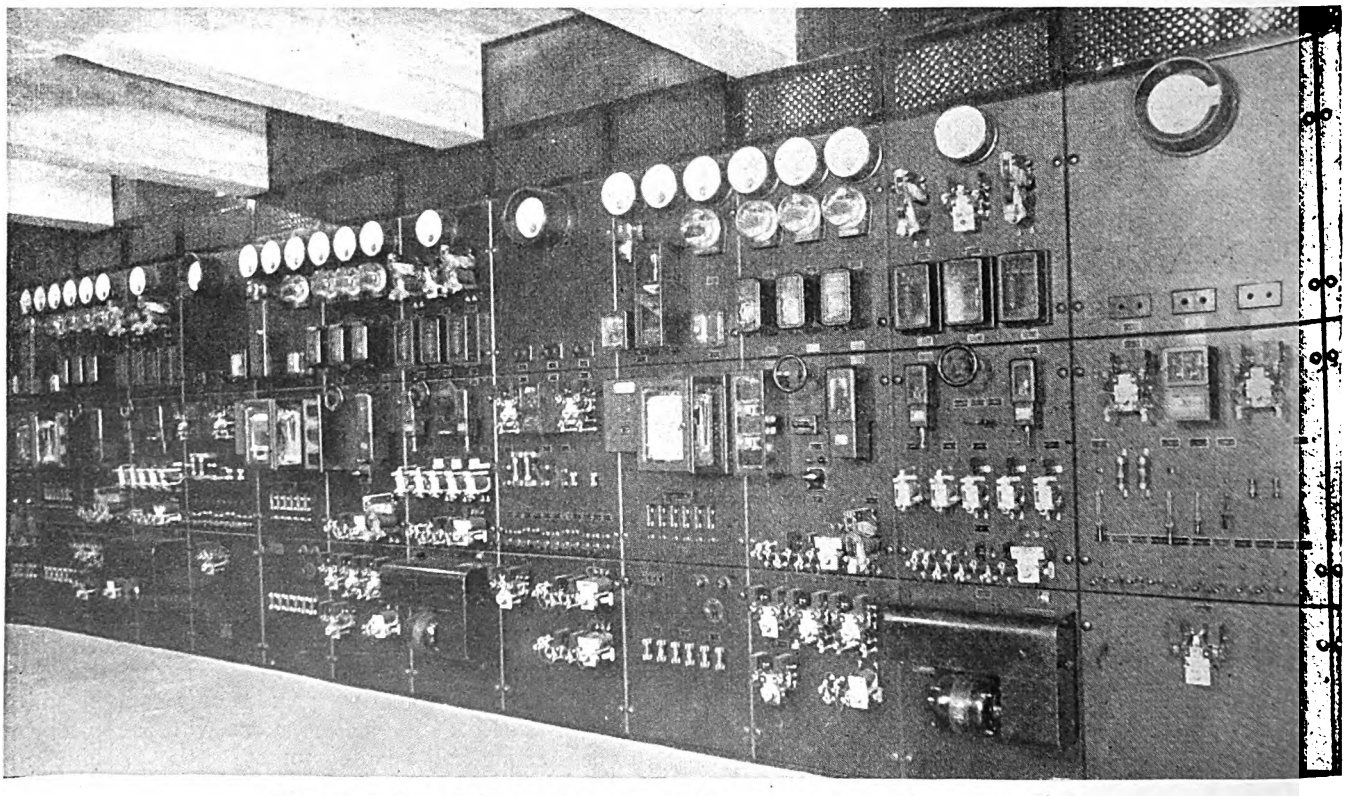
Locations of the two substations and six circuit-breaker houses of the Cleveland electrification are shown on the map

Located in the basement of the station is a Reed continuous-type air filter and a motor-driven fan for each motor-generator set. Ventilating air is taken from outside, cleaned by the air filter and then passed into the foundations of the set. The machines take this cool air from below and discharge it into the main room, whence it finds its way out through roof ventilators.

Main Converting Units Are Motor Generators

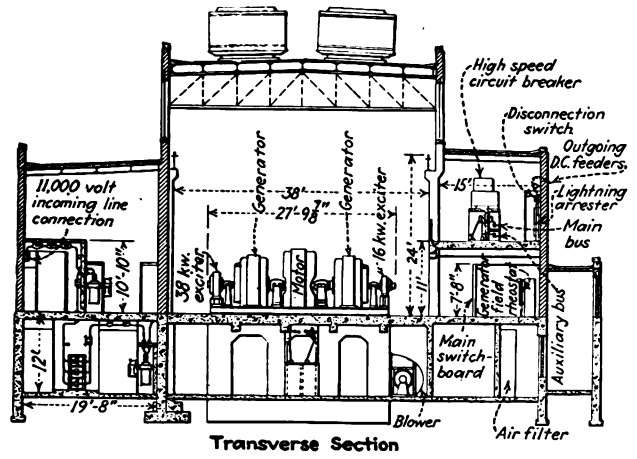
The motor-generator sets for converting the 11,000-volt, 60-cycle supply to 3,000-volt d.c. are of the three-unit type, nominally rated 3,000 kw. They are designed for handling a 300 per cent load for five minutes, or a 150 per cent load for two hours, after a constant temperature has been attained at normal load. The synchronous motor of the set is rated 3,600 kva. at 360 r.p.m., and is direct coupled to two 1,500-kw., 1,500-volt generators permanently connected in series.

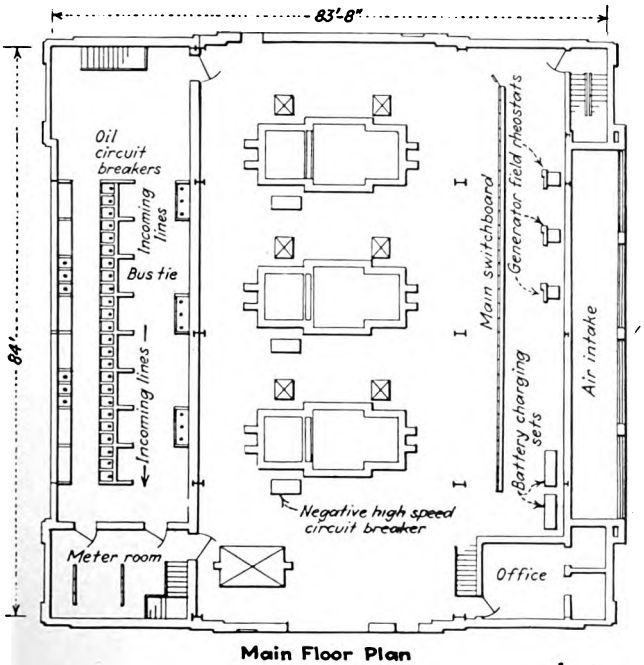
The set is equipped with two exciters. One, rated 16 kw. at 125 volts, supplies power to the fields of the two generators and the second exciter. The other exciter, rated 38 kw., supplies current for the motor field, operating through a range from 40 to 140 volts. This unit also has a series field coil which carries the main load

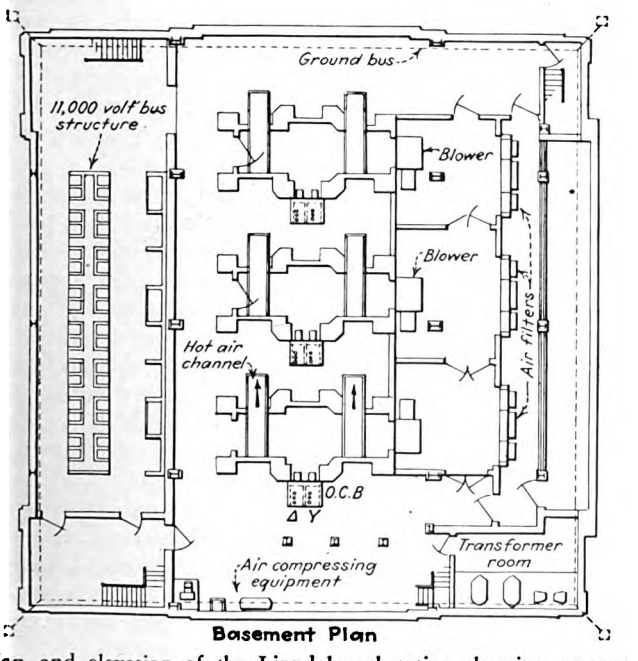


The automatic switching equipment provides complete protection to all circuits

Digitized by Google







Plan and elevation of the Linndale substation showing arrangement of the motor-generator sets and switching equipment

direct current, compounding the exciter voltage and hence the motor field in proportion to the load. This gives a practically constant power factor up to 300 per cent load. At light loads, the power factor has a tendency to lag. In order to compensate for this a relay cuts out a portion of the exciter field rheostat at light loads, increasing the excitation and maintaining a practically uniform power factor throughout the complete range.

The synchronous motor armatures are wound for the incoming power supply at 11,000 volts and no step-down transformers are required. The motor windings are connected in Y for starting and in delta for running, obviating the use of auto-transformers.

Both Local and Remote Supervisory Control Used

The motor-generator sets may be started by either local or remote supervisory control, as determined by the position of a selector switch in the substation. If a.c. power is available and all of the protective devices indicate that the set itself is in condition to be started, closing of a control switch to start up a motor-generator set will actuate a master contactor which, in turn, initiates the sequence. Starting voltage is supplied to the motor, and the set is brought up to speed. The field of the motor is then partially excited with a value of field current which will provide the best condition for making the transfer from starting voltage to full voltage.

As soon as the motor field is properly established, the motor windings are changed from the Y starting connection to the delta running connection. This scheme provides a very smooth transfer from the starting to the running voltage, as during the change from Y to delta there is a 30-deg. shift in the electrical position of the motor windings. The windings are so connected that this phase displacement compensates for the slowing up of the rotor during the time of transfer, and it happens that the amount of drift back of the rotor, during this period, corresponds to almost the 30 deg. made by the change in the winding connections. Next the negative high-speed circuit breaker is closed and the voltage of the generators allowed to build up. One of the two positive breakers is then closed and the generators are ready to have their voltage adjusted to the correct point for connecting to the d.c. bus.

All of the d.c. 3,000-volt switching is done by means of high-speed air circuit breakers. One of these, connected in the negative side of the set between the commutating field and the armature of one of the generators, is set to trip on severe overload or short circuit. On opening, it inserts a limiting resistor in series with the generators and reduces the current to a nominal value. At the same time, interlocks on it open the positive breakers and operate a "field-killing" contactor which inserts a resistor in the generator shunt field circuits. The series and commutating fields of both generators are on the low side of the negative breaker and are consequently connected solidly to the negative bus and the rail. With this arrangement it is not necessary to provide any more insulation for these fields than is ordinarily used for lower-voltage machines. For the positive connection to the bus there are two high-speed breakers, one merely used as a contactor device, while the other is so connected that it will trip on reverse current. This latter breaker provides fast protection if for any reason power is fed from the a.c. bus into the set.

When a set is shut down the field rheostat is run to

Digitized by Google

a point corresponding to slightly less than normal voltage. While starting, field current is not supplied to the main generators, as the field-killing contactor remains open until after the change is made from starting to running voltage on the motor and the negative high-speed breaker has closed.

If the unit is the first to be started in the station it will not be connected in unless the bus voltage is below normal. A voltage directional relay, together with an indication of low bus voltage, causes the positive line breaker to be closed.

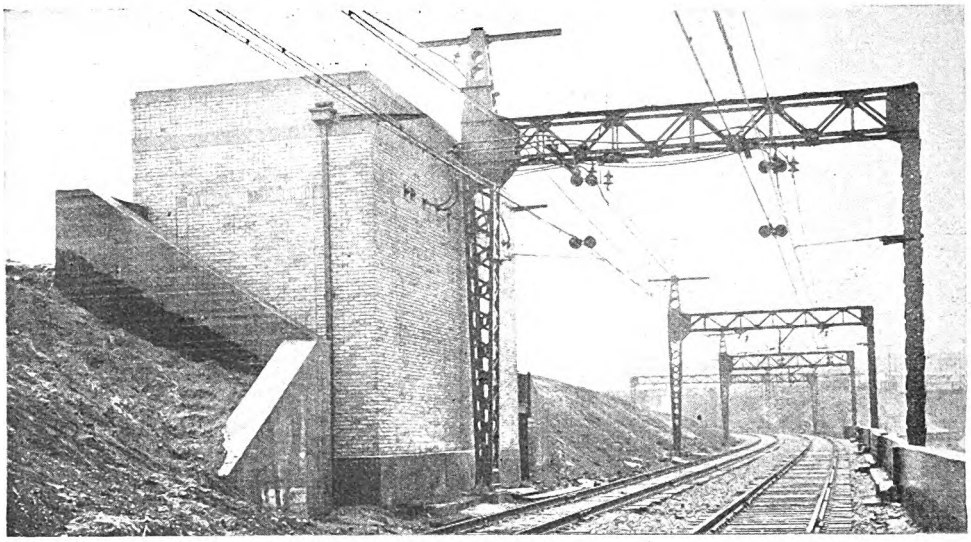
If the bus voltage indication was at normal when this set was started, it would not be connected to the bus but would merely run idle until a reduction in the bus voltage (indicating that a load had caused a drop in the voltage supplied by the adjacent station) would cause the set to be connected to the bus.

Much the same action takes place if other sets are running in a station. However, the voltage-regulating relays then function to maintain the bus voltage at all times. Consequently a reduction in bus voltage cannot be used as an indication of the presence of load, but a current relay, one of which is associated with each machine, gives the necessary indication.

The method of regulating the station voltage and of adjusting the load between the various units is especially interesting. A voltage-regulating relay is connected across the station bus. If a single unit is operating, this relay will function to maintain the bus voltage by controlling the motor-operated field rheostat, and will maintain approximately constant voltage between no load and the maximum rating of the set. At this point the control is taken from the voltage relay by a current relay which will act to maintain constant current output of the set as long as the load demand stays above its maximum current rating. If the set tends to stay at maximum current output for a time exceeding its rating, a thermal relay, which provides an integrated check on the heating, will act to reduce the load on the set.

When two or more units are operating, the control is very similar except that it is modified by load-balancing relays which tend to equalize the load. If the load is equally divided among all the sets, the voltage-control relay will raise or lower all of the field rheostats simultaneously to change the bus voltage. If two sets are operating and the load is not properly balanced, the load-balance relay will tend to restore the balance. One of the units is regarded as leading and the other unit is always belanced with respect to it. By this means the load will be gradually divided properly between the various units, and the rheostats will be controlled in a manner very similar to that followed by an operator.

If two or more sets are operating in multiple and the load is reduced so greatly that one of them tends to reverse, a reverse-current relay, set to act at a very small value, will disconnect the set from the line. This set will continue to run idle until load demand reoccurs, when it will immediately be rebalanced with the bus and connected to take its share of the load.



One of the six circuit-breaker houses and the electrified line of the Cleveland terminal system

Six circuit-breaker houses are used for tying together and sectionalizing the d.c. distribution system. One is located near each end of the electrification, the other four are spaced between the two substations. These circuit-breaker houses are small two-story buildings. The control switchboards, batteries and battery charging equipment are located on the first floor. The d.c. bus structure is identical with that used in the main substations and consists of the main auxiliary bus, together with a bus tie breaker. As in the main substation, all the d.c. breakers are of the high-speed type. The only other apparatus are the necessary storage batteries and charging equipment for supplying power for controlling and operating the breakers of the feeder circuits.

Control of all of the feeder circuits and other equipment in the circuit-breaker houses centers in the dispatcher's office. The apparatus is normally operated from there, although manual control is also provided at each location. The control circuits are so arranged that the breakers are entirely trip free. If a breaker trips on after being closed, the control must first be returned to the opening position before it will reclose.

Complete control of the electrical system is centered in the dispatcher's office, which is located adjacent to the train dispatcher's office in the terminal building. From there four wires run to each station and circuit-breaker house over which the load dispatcher has control. By means of an alarm bell and indicating lights, the dispatcher is immediately informed as to any change in the equipment under his control. Telemetering equipment gives a continuous indication of the loads on the various motor-generator sets. The supervisory system used is known as the synchronous selector system.

The machines and practically all the auxiliary equipment were furnished by the General Electric Company.

Prior to the formal opening of the Cleveland Union Terminal on June 28, both of the substations were in operation for several months while the engine crews were instructed in the handling of the new locomotives. Since that time they have been in practically continuous service.

Digitized by Google

Determining

Utility Depreciation

on a Logical Basis

By JOHN W. BURKE
Consulting Engineer
New York

Depreciation plays a smaller part in the retirement of property than is usually understood, while obsolescence has a major influence. The need for large reserves is open to question

DEPRECIATION, as the term is popularly used, has several meanings. On all constructed property there may be three kinds of depreciation, physical, service and financial. Before placing a money value on the depreciation of the physical property the nature and effect of physical depreciation must first be considered. For further simplification the element of obsolescence, which sometimes is treated as a part of depreciation, is taken up separately. The examples chosen to illustrate this discussion are chiefly elements of urban electric railway properties, which undergo rather more than the average depreciation on public utilities.

Generally, neither an entire property nor an element of it suffers any loss in capability of service until the process of depreciation is far advanced. Indeed, all stationary structures, such as track and buildings, and even the power house and substation machinery, might be depreciated to retirement and replaced with new structures and equipment without in the least affecting the service, or the comfort and safety of the patrons.

To a slight degree only has depreciation an effect on efficiency, sometimes increasing, sometimes decreasing it. A new car or a new machine requires less power to run it after its roughness, tightness and stiffness are worn off by a period of use. Per contra, it will suffer a slight inefficiency near the end of its life on account of wear and increased maintenance expenses.

In the ordinary class of property, depreciation and its powerful opponent, maintenance, are inextricably interwoven. This is the class of property whose life can be extended by maintenance through minor renewals or repairs. However, some minor elements of property cannot be saved by maintenance. A wooden tie, for instance, if of unusually good quality, or if treated with a preservative, or if laid in concrete or in soil constantly wet, or if subjected to very light traffic, will have a longer life than an ordinary tie. But in any event, it must fail through true depreciation, without any aid from repairs. This is true also of many other items. Many parts are retired not through depreciation, but through obsolescence.

When should maintenance cease and depreciation be allowed full sway? Or, when should a depreciable property be retired? The time for such retirement is when the current cost of annual maintenance exceeds the average cost of annual maintenance by the amount of the estimated annual depreciation. But the annual depreciation depends on the life, and the life cannot be known, even approximately, until near expiration. Moreover, the life can be influenced by the extent of the maintenance. Thus the problem contains two variables, life and maintenance, mutually interdependent but bearing an unknown relation one to the other. It can be solved only by judgment and experience.

Of totally different character with regard to depreciation are machinery and vehicles of the internal-combustion type, such as gasoline-driven motor cars, trucks, cranes, hoists and shovels. They are in a class by themselves. The violent vibration of engine, chassis and body produce defects that cannot be remedied by repairs. True depreciation rapidly ensues, and, in the case of automobiles, there is the factor of style obsolescence.

The difficulty, or, in most cases, the impossibility, of drawing a sharp line of demarcation between maintenance and depreciation is well recognized by practical operators. It is reflected also in the accounting orders of some of the public service commissions which require or permit public utilities to show maintenance and depreciation together in one account.

If the net effect, or the algebraic sum of the forces and influences inducing depreciation of the property less the maintenance tending to offset depreciation, be substantially constant, then the rate of depreciation is substantially uniform, and the total or accrued depreciation of the property at a given time would be in the ratio which the age of the property at that time bears to the total time the property will last in given service. This is the "age-life" hypothesis of depreciation. The age-life theorists, however, assume certain arbitrary life periods for the different elements of the property based, not on actual experience, experiment or research, but on the opinions of a few technical writers whose training and experience, in most cases, are entirely inadequate for an intelligent consideration of the subject.

While there generally can be no precise or accurate measure of depreciation on a merely age-life basis, a practical and fairly approximate measure may be had through careful examination of the property by competent, experienced investigators who examine the visible portions of the property. Due consideration is given to the original quality of the element when ascertainable,

Digitized by Google

and to its age, history, past service, and other known conditions. From these data there is a practical determination of the advance of the element toward complete wear-out or retirement through depreciation.

Accrued Depreciation Moderate

Physical depreciation, if unchecked by maintenance or repairs, diminishes, of course, the monetary value. Some elements, like land, are generally not depreciated. Others, like grading, are appreciated. In some instances the entire element is subject to depreciation; in others only a portion of it. For example, steel track rails are retired when roughened or weakened by a wear of less than $\frac{1}{2}$-in. on the head. The salvage value is a substantial portion of the cost new. Altogether, in an average property the portion subject to depreciation is substantially less than the total, and the monetary loss due to depreciation is usually but a small part of the total cost.

The monetary loss from physical depreciation is an operating expense. The annual charge to depreciation should be based on a careful examination of the physical property every few years by competent judges, coupled with the routine records and observation of the operating officials. After a term of years, the accrued depreciation should be the sum of these annual depreciations, less the cost of major renewals or replacements. Minor renewals and repairs are covered by charges to maintenance. The province of a depreciation reserve is to afford a fund for large individual retirements that cannot conveniently be met by maintenance charges in any one year.

In logic and equity, depreciation has no effect on the rate base. The rate base represents the property of the owners. Depreciation is an obligation of the users. Except in rare instances, the owners place in public use elements of property which are entirely new, and they are worn down in the service of the public. It is universally admitted that the public itself must repay this service in some form. Yet some, who concede that fact, still illogically maintain that the accrual of this depreciation through a series of years is not an operating expense but should be charged against capital account in determining the rate base.

In those classes of public utilities whose rates are closely scanned by the public, it is sufficiently difficult to secure adequate rates and of questionable wisdom to attempt to collect, in addition, a theoretical amount for an unnecessary and unjustified excess depreciation. This opinion and some others of those expressed in this article are well illustrated in the testimony of several of the ablest executives and operators in hearings before the Interstate Commerce Commission on its study of depreciation accounting under Docket No. 15100, which has been before the commission for the past seven years.

From the testimony in this case it appears that it is not only difficult and impracticable to separate, even approximately, the elements of the physical property restored by current repairs from those retired at long intervals; but the repairs and the retirements alike are properly chargeable to operating expenses. The actual total cost will be the same, however it be distributed in the accounting. Any elaborate accounting on some age-life hypothesis of depreciation will only add a useless extraneous cost.

Service and Financial Depreciations

Service depreciation is an inefficiency or inadequacy below a first-class standard of service, and is, or may be, due to excessive physical depreciation; deficient or deferred maintenance; inferior design, construction or equipment; inconvenient or unskillful schedules; lack of care and courtesy; lack of harmony between men and management, and other similar lapses in administration. The portion that physical depreciation contributes to service depreciation is generally very small, or entirely negligible.

In the meaning that financial depreciation is a diminution of capital due to physical depreciation of the property, such diminution can never occur under normal conditions of operation and management when the property is properly maintained. In case of sale of private property, the retirement reserve fund should be paid over to the purchaser, or the same result effected by deducting its amount from the value of the property new.

Excessive Reserves Objectionable

Treatment of depreciation from the financial viewpoint was clearly reviewed in Interstate Commerce Commission Docket 15100 by the late Robert A. Carter, then a vice-president of the Consolidated Gas Company of New York in charge of finances and accounts. Before the commission he testified in part:

> Provision for repairs should be treated in the same manner as provision for labor or coal or oil or taxes or similar items of expense. The actual cost of repairs should be charged to the operating expenses. In respect to retirement, in order to equalize the effect of property retired so that a disproportionate burden may not fall upon the operations of any one year, the amount provided should be treated as a charge to operating expenses, and a corresponding amount credited to a retirement suspense account . . . against which items of plant and equipment, actually retired, should be charged. . . .

George C. Mathews, then chief statistician of the Wisconsin Railroad Commission, and who had been a member of the sub-committee of the National Association of Railway and Utilities Commissioners which drafted the National classification, in his testimony said:

> The nature and size of reserves to cover retirement losses will vary both with the size of the property and the degree of diversity in its units. Given properties of similar character, the larger property will have less need of carrying retirement reserves. . . . Equalization is needed only for relatively large units of property. . . . For these classes of property no one can forecast lives. Reserves built up on a life basis will have the appearance of scientific handling, but the substance will be lacking. The life of poles or ties or rails may be estimated with some degree of accuracy, but when we come to the very property against which reserves are needed the life estimates are mere guesses.
>
> The rule proposed in the accounting classifications of the National Association of Railway and Utility Commissioners is sufficient to cover the situation, i.e., that a retirement reserve for large sections of continuous structures is sufficient. . . . Proper and adequate reserves need provide only against extreme fluctuations in retirement losses, and experience and judgment should not be subordinated to life tables which, except by accident, cannot be correct.

Besides the large amount of pertinent information brought out by the hearings in I.C.C. Docket 15100, there are similar data found in numerous cases before the courts, all subscribing to the view that large depreciation reserves are unnecessary.

Age-Life Hypothesis Not Borne Out

There is a sharp contrast between the practical and authoritative opinions given in such testimony and the ideas of the age-life proponents. The popular idea of age-life depreciation contains sufficient plausibility to intrigue the impractical or inexperienced. In relation to public utilities it was accepted by many as a prudent provision calculated to safeguard the interests of both the rate payer and the investor. But careful observers

Digitized by Google

soon discovered that, on the life tables commonly used, it had a tendency to build up excessive reserves.

The origin of these life tables either here or abroad is difficult to trace. No reliable authority vouches for them. Even if an attempt were now made to ascertain the average service lives of the elements of the physical property, it would be extremely difficult to accomplish. If accomplished at all it would have to be revised constantly to correspond with the varying quality and service of the element. And, after all this continuing effort, we should have only the average lives, without any assurance that they would agree, even remotely, with the actual lives on any particular property.

While experienced engineers have recognized for many years that the use of the prevailing life tables must result in the accrual of excessive amounts in the depreciation reserve, an example of this result is afforded in the New York Telephone Company case, a decision on which was rendered Nov. 7, 1929, by three Federal judges sitting in the District Court for the Southern District of New York.

The court found, in effect, that the amount of the depreciation reserve was *prima facie* evidence of the extent of the actual depreciation, despite the contrary claim of the company and other evidence which had been accepted by the master. As this reserve was invested in the property included in the inventory and rate base, the net effect is that it was added in full to the reproduction cost new of the original property and deducted in full through depreciation of the entire property, leaving the rate base as the reproduction cost new of the original property, which is entirely equitable.

To sum up, the courts hold that only the actual depreciation should be deducted to arrive at a fair rate base, but it lies entirely within their discretion to find that the balance in the depreciation reserve is in fact the measure of the actual depreciation and that is what in general they may be expected to do. This was done in the New York Telephone Company case. But the District Court for the Northern District of Illinois, in its opinion in the Illinois Bell Telephone Company case on Jan. 31, 1930, took the contrary view. In this case, the reserve was $26,000,000, while the actual depreciation was found by the court to be about $14,500,000. The entire reserve had been collected from the rate payers and used by the company for extensions and additions to its property, and, in the opinion of the Illinois Commerce Commission, "the extensions and additions paid for from such moneys should not be considered, in arriving at a base upon which to compute rates for telephone service."

The statutory court reversed the commission, holding that the exclusion from the rate base of extensions and additions to the amount of $26,000,000 paid for from the depreciation reserve was clearly erroneous, that constitutional protection against confiscation does not depend on the source of the money used to purchase the property, that the revenue paid by the customers for service belongs to the company, and that the amount, if any, remaining after paying taxes and operating expenses, including the expenses of depreciation, is the company's compensation for the use of its property.

This opinion of the federal statutory court in Illinois appears to reflect the strictly legal view of the depreciation reserve as contrasted with the view taken by the similar court in New York which is in better line with the recent trend of opinion, and is more likely to prevail in future. In both the New York and the Illinois cases, the state commissions, like the court in New York, deducted the entire depreciation reserve to arrive at the rate base. In both cases, the reserve had been invested in the property included in the valuation inventory. It follows consistently that such part, if any, of the depreciation reserve as is in liquid form, such as cash, negotiable securities or other readily convertible property, should not be deducted from reproduction cost new in arriving at the rate base.

These principles are clearly enunciated by the courts, although, through lack of competent engineering evidence in the case, they sometimes fail to give effect to them in practice. The Supreme Court in the case of the United Railways & Electric Company, of Baltimore, Jan. 6, 1930, quoting from the Knoxville Water Company case, said:

> The utility is entitled to see that from earnings the value of the property invested is kept unimpaired, so that at the end of any given term of years the original investment remains as it was at the beginning.

We have just considered two properties in which the earnings permitted of accruing depreciation reserves double the actual depreciation as estimated by the engineers and the commissions.

Should actual depreciation be deducted to find the rate base in a property honestly and efficiently managed, but whose rates are so low as to prevent the accumulation of a reserve equal to the depreciation? That has been the experience of numerous public utility properties during the past ten years.

The Baltimore and Knoxville decisions logically determine that a deduction in excess of the reserve in fact collected from the rate payers is inequitable. Yet it is the almost universal practice to make some reduction for the actual depreciation, even when there is little or no reserve, and no claim of dishonest or inefficient management.

Normal Condition the Proper Standard

Ordinarily, a property comprised of numerous composite parts is in an abnormal condition when new, a condition experienced only once in its lifetime.

Hence the *reductio ad absurdum* of calculating actual depreciation as the relation of a normally operating property to its physical condition when new. Both sound economics and public policy require that the new property, intelligently maintained, repaired and restored, be worn down in the public service until it reaches its natural and normal physical condition, and that thenceforth it be kept as near as practicable to that condition.

Experience shows that the normal physical condition of well-operated public utility properties generally lies between 75 per cent and 95 per cent of new. It is highly desirable that engineers and regulatory bodies give special study to the determination, within narrow limits, of standard percentages for the proper normal condition of the several types of public utility properties, such as gas, light and power, railway, telephone, water-works. In a given case, there also would be found to what extent, if any, the particular property differed from the average, and its normal condition differed from the standard of its type. Then, for example, if it were found that an individual property whose normal condition should be 85 per cent of new was, in fact, five per cent below a first-class normal operating condition, its actual depreciation would be five per cent of 85 per cent, or 4¼ per cent, instead of 19¼ per cent, of reproduction cost new.

Digitized by Google

Now consider the example cited of a utility whose normal condition is 85 per cent, actual condition 80¾ per cent, and actual depreciation, therefore, 4¼ per cent. A reserve of 4¼ per cent is sufficient to restore it to first-class normal physical and operating condition. Suppose that, to avoid a deduction from fair value, it is required to have 19¼ per cent in the reserve. How can the excess 15 per cent be used in connection with the property whose integrity it is intended to secure? Of course, it can be invested in other property, or in securities. But it cannot be used as it was designed to be used, at least not for the decades or the generations that the property continues in public service. To do so would, in effect, involve the discarding of 15 per cent of property in normal condition and replacing it with new property, which, in due course, would assume the same normal condition, with no interim improvement in the service.

Although little emphasis is usually placed on obsolescence, and the courts and commissions treat it as an incidental part of depreciation, in the majority of public utilities it is, in fact, the greater part. Taking the term obsolescence to include inadequacy, change in the art, change in styles and in public taste, and all other similar contingencies, most of the elements of property are retired, not because of wear and tear and disintegration, but because of obsolescence. And obsolescence concededly cannot be measured by any age-life hypothesis.

There is an impression that obsolescence is likely to be a sudden or abrupt phenomenon requiring an immediate, or at least prompt, change in equipment. But generally there is ample notice of the impending changes, and an alert and efficient management usually can sense them years ahead. It is just a problem of intelligent care and prudent foresight.

Retirement for Economy

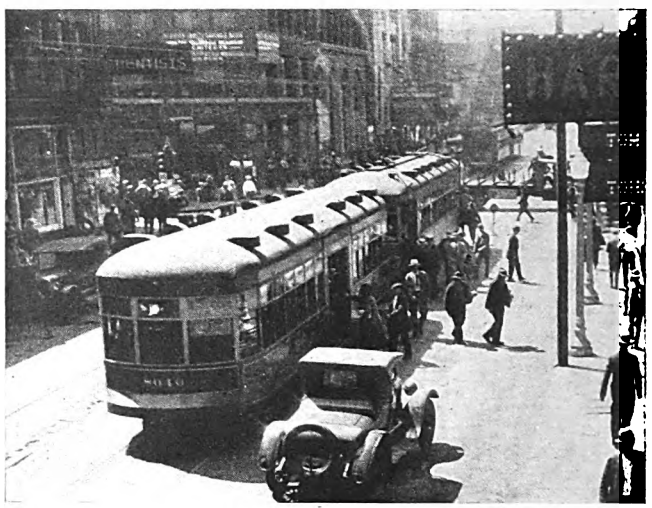
Past experience shows that a large part of the retirement results from reasons of economy. Whether units in excellent working condition are discarded because new types are more economical lies within the discretion of the management. If the expected economy justifies the change, and it can be financed, it should be made. The courts have ruled such matters to be within the rights of management. There now is a strong tendency to retire old street railway cars for reasons of aesthetics. Competition from automobiles renders it necessary to make the cars more attractive to patrons. Back of the idea of aesthetics is economy, as the net earnings would be increased by larger gross revenues due to attractive cars.

If the unit or equipment in question is of large value, a reserve should be built up gradually to smooth out the cost of its retirement when that becomes necessary or advisable, and the fund depleted by the several retirements as they occur. All this requires the exercise of good engineering and operating judgment. No possible formula can be substituted for this practical method. The amount accrued and written off at retirement should be the reproduction cost new of the equipment retired. Thus the utility will be credited with the actual cost of the equipment expressed in dollars of the time of its retirement and the investment kept intact.

The installation of new construction, plant or equipment, following retirement of the obsolete items of property, opens a new financial chapter. The capital account should be increased or diminished by the excess or deficiency in cost of the new items of equivalent capacity as compared with the reproduction cost new of those replaced. If the new items are of different capacity, a further proper adjustment should be made in the capital account. Any excess capital is, of course, furnished by the utility and not by the patrons. Any economies resulting from the new plant should be shared with the patrons, after providing a fair return to the utility and a depreciation reserve estimated and accrued in the manner heretofore described.

Trailer Operation Abandoned in Chicago

WITH the recent withdrawal of sixteen trailers from the Halsted Street line, the Chicago Surface Lines has suspended completely its car-and-trailer operation. Prior to this step, on July 18, the last trailers on Madison Street had been removed from service. Trailer service on this east-and-west artery was originally installed in 1923. Principal advantages to be gained from the change are: more frequent service, faster schedules, and greater flexibility in the use of equipment.



Car-and-trailer operation in Chicago which has been suspended to permit more frequent and faster service

Effective July 19, schedules were put into effect for single cars on Madison Street which practically doubled the frequency of service. During the rush hours, cars are now being run on a 60-second headway instead of a train every two minutes as on the previous schedule. In non-rush periods a car is dispatched every two minutes, instead of a train every 3¼ minutes. On night schedules, also, the frequency of service has been increased.

Speed of operation on Madison Street has been increased approximately 12 per cent with the single units. This additional speed has resulted in a saving of 5½ minutes to the passengers traveling from Austin Avenue to the Loop, a distance of 6.92 miles.

In all, a total of 100 trail cars are effected by the changes recently made. These trailers were purchased in 1921 and all are in excellent condition. As soon as funds are available they will be equipped with motors, control, compressors and other necessary apparatus, and placed in regular service on opposite routes. They have double center doors, but no end doors. With two-man operation it is believed that no additional entrance or exit facilities will be needed in certain classes of service.

Digitized by Google

Central Master Mechanics at the Dayton Country Club, where they enjoyed a luncheon given by the Ohmer Fare Register Company prior to being conducted through its plant

Central Master Mechanics Have Varied Program

COVERING a wide range of subjects pertaining to maintenance, the Central Electric Railway Master Mechanics Association, in convention at the Miami Hotel, Dayton, Ohio, on Sept. 10 and 11, spent a profitable two-day period. Among the topics discussed were modern braking, high-speed motors, transportation developments, motor maintenance, trolley buses, Youngstown cars, sand blasting, car wheels, safety methods, fire protection and journal boxes. A feature of the program was the showing of several sound pictures by E. S. Gunn, General Electric Company. The meetings, presided over by President A. J. Challeen, superintendent of equipment Eastern Michigan Railways, were attended by approximately 100 delegates.

Following the president's opening remarks, the members were welcomed by Mayor McDonald, Dayton; T. E. Howell, general manager City Railway, and Martin Ackerman, vice-president in charge of operation People's Railway.

The first paper, read by Lawrence Wilcox, Westinghouse Traction Brake Company, on "Modern Braking of Electric Railway Cars," was prepared by G. L. Cotter of the same company for the Cedar Point meeting of the C.E.R.A., and was abstracted in the August issue. The paper told of the factors affecting schedule speeds and the need for improving braking performance.

J. B. Corderman, Cincinnati & Lake Erie Railroad, described the modern braking equipment on the new cars of his company, and told of the resulting increase in schedule speeds and the greater safety factor. He also spoke of their maintenance.

In a paper on high-speed automotive type motors, prepared by R. S. Beers, General Electric Company, and presented by E. S. Gunn, of the same company, the weight-saving and other advantages were brought out. Mr. Beers compared the mechanical and electrical characteristics of these motors with the conventional slow-speed type, and related the results of the lighter motors in use on gas-electric buses, trolley buses and street cars.

A. B. Creelman, Youngstown Municipal Railway, described the thirteen new cars recently purchased by his company, and told of the results obtained from them. He cited a few of the troubles in the equipment that developed and explained how these were all remedied.

In the presentation of a paper, "Armature and Motor Maintenance," O. C. Wright, St. Louis Public Service Company, defined the term "maintenance" and outlined the basic principles for planning any successful program. He outlined the details which should be given especial care, and presented a complete program of tests and repairs. Mr. Wright described the tests and checks in the order in which they should be made and gave several valuable notes on the dipping, baking and handling of armatures.

In his address, "Recent Developments in Transportation," S. B. Cooper, Westinghouse Electric & Manufacturing Company, pointed out that four fundamental objectives in securing higher income or lower expenses, were being sought: reduced weight, lower floor and step heights, less noise, and faster service. The first three objectives, Mr. Cooper indicated, are largely influenced by the motor equipment, and the fourth by both motors and control. To obtain the full advantage of lighter and smaller motors, it was necessary, he added, to develop a form of gearing that would permit higher gear ratios, smaller wheels and a reduction of noise. Mr. Cooper showed how the WN drive had met the requirements satisfactorily, and gave figures on the life of these gear units. Other recent developments covered by Mr. Cooper included variable automatic control, trolley buses, and high-speed interurban cars.

Principles of Trolley Bus Maintenance

Developing the subject of trolley bus maintenance, Walter C. Becker, Chicago Surface Lines, outlined the basic principles of maintenance for street cars and motor buses, and pointed out that the trolley bus system must be based on all of these. Mr. Becker particularly emphasized the importance of a comprehensive maintenance system with fixed periods, based strictly on mileage, for servicing, inspection, repairing, unit replacement and overhauling. In concluding, Mr. Becker outlined definite procedures for daily inspection, lubrication, unit change and general inspection.

In a discussion which followed, concerning the use of the trolley shoe, E. J. Jonas, E. M. Lunda, A. J. Challeen, and G. R. Green, participated. The discussion was supplemented by reading a letter from J. H. Lucas, Milwaukee Electric Railway & Light Company, in which the results of polishing of trolley wire with graphite and using trolley shoes were given.

"Modern Sand Blasting" was the subject of a talk by C. T. Hertzsch, American Car & Foundry Company. The speaker described an effective but inexpensive sand-

Digitized by Google

blasting outfit, and told of the advantages and savings of installing one. Mr. Hertzsch also gave valuable pointers on selecting and conditioning sand, blasting thin sheets, maintaining the equipment, making adjustments and using primers.

An organized body, headed by a safety authority, to educate employees and obtain their interest, establishment of strict rules and enforcing them are necessary for maintaining a successful safety policy, according to F. H. Humphreys, American Car & Foundry Company. The speaker particularly urged the 100 per cent use of goggles, and cautioned that goggles of the correct type must be used. Mr. Humphreys pointed out that, aside from the humanitarian aspect, a safety campaign and use of modern devices result in enormous savings for the company.

G. E. Doke, president, Association of Manufacturers of Chilled Car Wheels, presented a paper, accompanied by pictures, on the history of the development of chilled tread wheels. Mr. Doke told of the research laboratory maintained, the careful inspection of plants, and the adoption of standard foundry practice specifications by the member plants. He also described the single-plate type of wheel and related its development and advantages.

"Carbon Dioxide Fire Protection" was the subject of a talk by H. B. Teter, of Walter Kidde & Company. The speaker described the new Lux standard extinguishers, explained the theory of how they snuff out fires, and listed the advantages of this type. The talk was supplemented by moving pictures, showing the effective use of these extinguishers in putting out various kinds of fires.

At this juncture in the program, moving pictures of the Central Master Mechanics being conducted through the Ohio Brass plant at Mansfield during their last meeting, were shown.

The next paper, "Maintenance of Truck Journal Boxes and Brake Rigging," by C. N. Pittenger, G. C. Kuhlman Car Company, was read by H. G. Arthur, of the same company. Mr. Pittenger showed how trucks are being affected by the severe operating and traffic demands of today, and pointed out various truck features which make renewals less frequent and less costly. Among the truck improvements, described by Mr. Pittenger, were wear plates in journal boxes, bushed half-ball brake hangers, bushed half-ball bolster guides, adjustable balancing hangers, automatic slack adjusters, and drop-forged pivotal plates.

Opinions on Several Topics Expressed

Discussion of the association's questionnaire brought forth the following conclusions: Metal is preferred to wood for sash in new car design; single side body sash is preferred to double for both city and interurban operation; opinion is divided on the use of wide-vision windows; automotive type high-pressure grease fittings are desirable for certain parts of truck and brake rigging, but unsatisfactory for others; pressed pedestal type seat supports are preferred to the open cast type; chromium plating is favored for the finish of corner grab handles on seat backs; anti-friction center plates, of the new design, with chromium plated ball bearings, are desirable for use; hard coal gives better results than coke for heating and is more economical; water alone is successful for washing cars with lacquer finish, if proper facilities are available, but certain compounds have been developed that assist in this work; use of low-viscosity oils has proved successful in lowering energy consumption.

Through the courtesy of the Cincinnati & Lake Erie Railroad the delegates were given a ride on one of the new high-speed interurban cars of that company. Approximately 45 enjoyed the trip to Middleton and return. At the banquet in the evening, the association was addressed by Judge R. W. Baggott, Dayton. Mr. Baggot reflected on our present modes of living, and discussed entertainingly certain of our present laws which are designed to mold our living habits.

Following the morning session of the second day, the delegates were tendered a luncheon at the Dayton Country Club by the Ohmer Fare Register Company. A feature of the luncheon was an informal address by John F. Ohmer, president of the company, who recalled many points of historic interest regarding the Central Association and presented a broad picture of the present rate question. Mr. Ohmer related the progress made so far, and told of the need for research and detailed analysis on the part of the railways. "Obtaining a scientific fare structure, to assure the most revenue, is largely a problem of studying requirements and educating the public," he concluded. In the afternoon the delegates were conducted through the Ohmer plant, and given an opportunity of studying its products and methods of manufacture.

The Readers' Forum

Street Car Interurbans

South Manchester, Conn., Sept. 14, 1930.

To the Editor:

During a recent trip through the West, I inspected an interurban of the modern type on which millions of dollars have been spent to make it the equivalent of a steam road electrification. But all these improvements seem to fall flat. People do not take it seriously as a railroad.

Now why is this de luxe interurban falling down? There are just four reasons for it:

1. Its steel cars are camouflaged to look like street cars; having street car bells and fenders.
2. Its trainmen are encouraged to believe they are "street car-ing" instead of "railroading."
3. Its motormen are forced to wear the crude old blue street railway uniform. Its management throws up its hands in horror at the idea of the motormen wearing overalls and jumpers.
4. In its advertisements it makes no reference to the railroad service it is giving, but rather uses the word "cars" throughout, which the riding public interprets to mean street cars.

So there you have a super street car line instead of an electric railroad, as it should be.

It is a pity that such interurbans do not realize the folly of imitating old-fashioned street car type interurbans in this modern day.

William H. Snow.
(Twenty years with the interurbans)

Digitized by Google

Monthly and Other Financial Reports

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Market Street Railway, San Francisco, Cal.					
Aug., 1930	770,284	643,287a		126,997	72,923
Aug., 1929	825,433	680,391a		145,042	87,384
12 mo. end. Aug., 1930	9,407,795	7,928,796a		1,478,998	805,960
12 mo. end. Aug., 1929	9,578,190	8,156,738a		1,421,452	697,813
Northwestern Pacific Railroad, San Francisco, Cal.					
July, 1930	597,419	356,727	35,848	204,787	195,195b
July, 1929	613,599	445,219	36,539	131,797	125,625b
7 mo. end. July, 1930	3,167,396	2,944,975	252,424	*30,310*	*75,023b*
7 mo. end. July, 1929	3,329,091	3,069,828	265,957	*6,996*	*22,648b*
Capital Traction Co., Washington, D. C.					
July, 1930	306,527	251,825	20,665	36,689	4,935
July, 1929	336,897	261,108	24,151	54,270	22,567
7 mo. end. July, 1930	2,431,706	1,771,873	186,100	488,890	274,026
7 mo. end. July, 1929	2,538,187	1,791,009	197,730	567,038	352,866
Aug., 1930	314,513	246,034	22,527	46,148	16,103
Aug., 1929	325,831	257,039	22,944	45,846	15,691
8 mo. end. Aug., 1930	2,746,221	2,017,908	208,627	535,038	290,130
8 mo. end. Aug., 1929	2,864,019	2,048,040	220,675	612,903	368,557
Washington Railway & Electric Co., Washington, D. C., (Ry. Dept. only)					
July, 1930	375,365	332,208a		63,807	8,456
July, 1929	428,989	356,792a		95,900	38,488
Jacksonville Traction Co., Jacksonville, Fla.					
July, 1930	78,772	68,953	8,834	604	
July, 1929	88,556	78,690	8,995	495	
12 mo. end. July, 1930	1,085,234	888,435	106,503	84,031	*70,688*
12 mo. end. July, 1929	1,166,991	946,664	106,622	107,446	*52,192*
Honolulu Rapid Transit Company, Honolulu, Hawaii					
July, 1930	90,581	50,616	9,059	32,351	21,239
July, 1929	88,204	48,497	7,932	32,859	21,636
7 mo. end. July, 1930	607,329	357,140	62,305	196,875	114,737
7 mo. end. July, 1929	615,811	351,800	66,260	205,436	126,874
Chicago Surface Lines, Chicago, Ill.					
Aug., 1930	4,488,146	3,796,705a		691,441	680,219d
Aug., 1929	5,113,909	4,129,476a		984,433	807,925d
United Railways & Electric Co., Baltimore, Md.					
July, 1930	1,236,414	855,015	109,567	281,205	14,358
July, 1929	1,328,176	902,717	125,859	313,530	35,763
7 mo. end. July, 1930	9,732,148	6,646,837	942,389	2,220,504	313,440
7 mo. end. July, 1929	9,718,530	6,669,204	944,998	2,207,420	231,450
Aug., 1930	1,198,180	843,513	87,728	276,187	6,119
Aug., 1929	1,307,143	903,403	115,130	302,455	21,410
8 mo. end. Aug., 1930	10,930,328	7,490,350	1,030,118	2,496,692	319,559
8 mo. end. Aug., 1929	11,025,673	7,572,608	1,060,129	2,509,875	252,861
Boston Elevated Railway, Boston, Mass.					
July, 1930	2,371,152	1,958,397	149,674	277,859	*424,295*
July, 1929	2,496,387	1,969,935	125,342	412,871	*285,903*
Eastern Massachusetts Street Railway, Boston, Mass.					
Aug., 1930	624,332	416,493	27,936	190,626	28,399
Aug., 1929	689,272	465,546	30,269	213,292	59,177
8 mo. end. Aug., 1930	5,331,477	3,417,726	234,542	1,760,106	378,241
8 mo. end. Aug., 1929	5,813,685	3,633,666	259,132	2,069,587	641,750
Boston, Worcester & New York Street Ry., Framingham, Mass.					
3 mo. end. June, 1930	187,422	173,993	4,875	9,016	*4,843*
3 mo. end. June, 1929	182,681	158,108	4,875	20,248	6,388
6 mo. end. June 1930	351,175	322,666	9,750	20,358	*7,361*
6 mo. end. June, 1929	343,626	311,579	9,750	23,433	*4,286*
Middlesex & Boston Street Railway, Newtonville, Mass.					
3 mo. end. June. 1930	292,142	222,676		60,202	22,504
3 mo. end. June, 1929	297,550	246,720		42,453	3,732
6 mo. end. June, 1930	600,513	462,455		119,518	42,741
6 mo. end. June, 1929	599,801	492,596		90,508	72,704
Department of Street Railways, Detroit, Mich.					
July, 1930	1,549,503	1,388,112	64,759	101,485	*41,888*
July, 1929	2,134,500	1,631,004	62,023	449,755	309,149
12 mo. end. July, 1930	23,753,814	19,230,965	769,198	3,879,065	2,152,560
12 mo. end. July, 1929	26,502,205	21,005,052	753,333	4,918,566	3,193,925
Aug., 1930	1,516,209	1,363,381	63,560	93,399	*52,773*
Aug., 1929	2,136,238	1,650,272	62,178	432,368	287,182
12 mo. end. Aug., 1930	23,133,785	18,944,074	770,580	3,540,096	1,812,604
12 mo. end. Aug., 1929	26,641,025	21,101,478	752,076	4,950,693	3,240,691
Illinois Terminal Company, St. Louis, Mo.					
July, 1930	601,515	441,007	34,849	125,658	87,602b
July, 1929	676,206	468,340	23,427	184,439	136,338b
7 mo. end. July, 1930	4,363,169	3,082,426	199,999	1,080,666	780,146b
7 mo. end. July, 1929	4,758,600	3,292,887	164,235	1,301,351	969,937b
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
July, 1930	60,907	59,334	4,800	5,629	*24,217*
July, 1929	77,124	62,708	7,840	18,851	*11,520*
7 mo. end. July, 1930	545,624	437,036	33,600	122,176	*96,600*
7 mo. end. July, 1929	593,655	451,488	54,880	167,189	*58,008*
Brooklyn-Manhattan Transit System, New York, N. Y. e					
Aug., 1930	4,727,623	3,235,744	323,097	1,237,194	465,144
Aug., 1929	4,944,666	3,513,358	298,381	1,210,220	404,645
2 mo. end. Aug., 1930	9,741,200	6,506,803	660,779	2,727,400	1,185,446
2 mo. end. Aug., 1929	10,095,553	7,020,596	632,143	2,583,966	1,012,158
Brooklyn & Queens Transit Corporation, New York, N. Y.					
Aug., 1930	1,827,238	1,485,618	109,638	246,300	120,864
Aug., 1929	1,953,358	1,615,161	102,203	257,552	131,574
2 mo. end. Aug., 1930	3,744,356	2,981,332	217,817	573,824	324,298
2 mo. end. Aug., 1929	3,996,173	3,224,699	219,052	594,741	344,511
Hudson & Manhattan R.R., New York, N. Y.					
Aug., 1930	934,204	499,806a		434,398	98,977
Aug., 1929	990,160	520,500a		469,660	134,240
8 mo. end. Aug., 1930	8,140,996	4,107,856a		4,033,139	1,353,560
8 mo. end. Aug., 1929	8,262,106	4,193,138a		4,068,968	1,381,272
Interborough Rapid Transit Co., New York, N. Y.					
Aug., 1930	5,183,166	3,923,530	197,553	1,062,082	*763,482*
Aug., 1929	5,432,698	3,726,407	196,713	1,509,576	*280,146*
2 mo. end. Aug., 1930	10,565,714	7,803,965	396,102	2,365,646	*2,285,064*
2 mo. end. Aug., 1929	10,899,103	7,502,218	399,021	2,997,863	*580,523*
Long Island Railroad, New York, N. Y.					
July, 1930	4,018,939	2,184,746	483,296	1,349,828	1,180,528c
July, 1929	4,250,440	2,290,236	446,224	1,511,923	1,357,522b
7 mo. end. July, 1930	22,806,397	15,713,514	1,644,218	5,443,173	4,378,427b
7 mo. end. July, 1929	23,582,131	15,863,513	1,518,096	6,186,653	5,102,413b
New York Railways Corporation, New York, N. Y.					
July, 1930	469,638	413,480a		56,158	14,910
July, 1929	546,980	468,855a		78,125	15,007
7 mo. end. July, 1930	3,217,624	2,918,844a		298,780	13,824
7 mo. end. July, 1929	3,623,277	3,194,278a		428,999	4,401
New York, Westchester & Boston Railroad, New York, N. Y.					
July, 1930	224,469	120,856	25,377	79,450	*152,623*
July, 1929	238,506	131,563	24,015	83,675	*144,838*
7 mo. end. July, 1930	1,506,498	829,093	177,138	506,592	*1,103,349*
7 mo. end. July, 1929	1,451,618	888,502	153,680	414,522	*1,086,911*
Staten Island Rapid Transit Co., New York, N. Y.					
July, 1930	243,991	172,173	17,000	54,818	41,021
July, 1929	22,526	118,903	17,000	*113,647*	63,102
7 mo. end. July, 1930	1,445,923	1,093,148	120,500	230,693	176,011
7 mo. end. July, 1929	1,477,942	1,165,422	123,000	189,503	146,685
Third Avenue Railway System, New York, N. Y.					
July, 1930	1,429,730	1,116,731	95,580	241,456	2,066
July, 1929	1,507,860	1,228,495	97,511	206,065	*32,476*
New York State Railways, Rochester, N. Y.					
3 mo. end. June, 1930	1,923,656	1,848,894a		107,204	*257,414*
3 mo. end. June, 1929	2,265,029	1,784,378a		467,102	94,405
6 mo. end. June, 1930	4,153,235	3,832,300a		384,167	*353,087*
6 mo. end. June, 1929	4,821,204	3,705,312a		1,044,368	295,016
Cincinnati Street Railway, Cincinnati, Ohio					
Aug., 1930	635,164	441,923	58,645	151,643	*40,878c*
Philadelphia & Western Ry., Norristown, Pa.					
July, 1930	50,893				*470*
July, 1929	63,210				9,906
7 mo. end. July, 1930	402,898				39,560
7 mo. end. July, 1929	460,239				81,154
Galveston-Houston Electric Railway, Houston, Texas					
July, 1930	46,757	26,699	2,549	17,507	
July, 1929	51,752	27,753	2,563	21,434	
12 mo. end. July, 1930	535,657	311,381	32,581	191,887	*78,159*
12 mo. end. July, 1929	605,423	337,231	31,769	235,882	*34,970*
Houston Electric Company, Houston, Texas					
July, 1930	247,070	155,007	21,902	70,159	
July, 1929	277,144	175,103	25,440	76,600	
12 mo. end. July, 1930	3,229,626	2,026,460	255,395	965,189	584,163
12 mo. end. July, 1929	3,374,467	2,092,403	287,104	996,925	591,525
Calgary Municipal Railway, Calgary, Alta.					
7 mo. end. July, 1930	590,543	371,943			32,220
7 mo. end. July, 1929					48,193
Edmonton Radial Railway, Edmonton, Alta.					
July, 1930	62,225	43,476		18,748	*478*
July, 1929	67,629	46,568		21,060	713
7 mo. end. July, 1930	490,504	323,842		166,662	1,412
7 mo. end. July, 1929	501,392	314,109		187,282	14,846
Lethbridge Municipal Railway, Lethbridge, Alta.					
5 mo. end. May, 1930	22,778	19,764			*9,913*
5 mo. end. May, 1929					*7,561*
British Columbia Electric Railway, Vancouver, B. C.					
June, 1930	1,144,585	900,425			
June, 1929	1,133,017	801,355			
12 mo. end. June 1930	14,658,732				
12 mo. end. June, 1929	14,047,862				
Regina Municipal Railway, Regina, Sask.					
7 mo. end. July, 1930	246,101	168,733		77,368	*30,591*
7 mo. end. July, 1929					14,212
Saskatoon Municipal Railway, Saskatoon, Sask.					
7 mo. end. July, 1930	229,944	158,448	9,013		*18,193*
7 mo. end. July, 1929					14,162

a Includes taxes. *b* Net after rents. *c* Withdrawn from fare control fund. *d* After deducting city's 55 per cent. *e* Including Brooklyn & Queens transit system.

Digitized by Google

JOURNAL Maintenance Awards

Company trophy, individual cash prize and two certificates of merit go to Cleveland. Ottawa Electric Railway wins recognition in Department of Rolling Stock and Shops. Third period prizes announced.

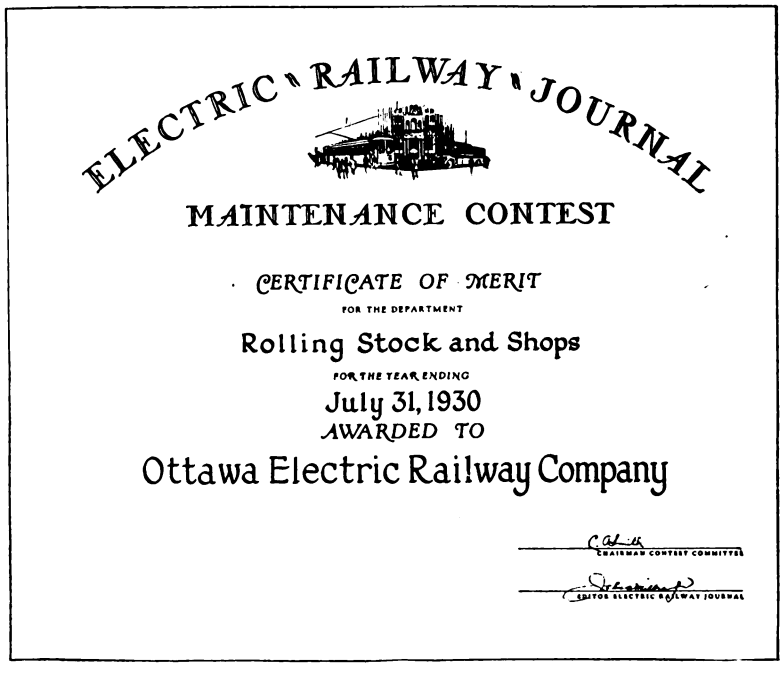
DUPLICATING its performance of a year ago, the Cleveland Railway won the company trophy in the ELECTRIC RAILWAY JOURNAL Maintenance Contest for the year ended July 31, 1930. The keen interest taken by the Cleveland Railway in this contest was shown by the large number of maintenance items submitted, exceeding by a wide margin the number submitted by any other company. Not only were the contributions of this railway numerous, but they also possessed considerable merit as shown by the number of quarterly prizes awarded to its representatives. In the first period of the contest two of the three prizes were won by Cleveland men. In the second period one prize went to Cleveland, and at the third period two were won by representatives of this company. One of the two prize-winning items in the first period was considered by the judges to be the most meritorious item submitted during the entire contest, and was awarded the individual cash prize of $100.

In the Departments of Way and Structures and Bus and Garages, the contributions from Cleveland were so outstanding that the company was awarded two certificates of merit. In the Department of Rolling Stock and Shops numerous excellent contributions were received from the Ottawa Electric Railway. One of these won the quarterly prize for the third period. In view of the keen interest shown by this company and the high quality of the material submitted, the judges unanimously agreed to award the certificate of merit in this department to the Ottawa Electric Railway.

After considering all the material submitted during the contest, the judges were unanimously of the opinion that the best single item was that submitted by Richard Grant, garage foreman, Cleveland Railway. This item, describing a double air chuck used to inflate dual tires, appeared in the March, 1930, issue of ELECTRIC RAILWAY JOURNAL, page 160. A few days before the publication of this item, the JOURNAL learned with keen regret of the death of Mr. Grant in an automobile accident. After consultation with officers of the Cleveland Railway, it has been arranged that the award be made to Mr. Grant's widow, Mrs. Florence Grant, of Lakewood, Ohio.

Richard Grant

AS THE result of injuries received in an automobile accident, Richard Grant died on Feb. 11, 1930, at the age of 39. His passing was keenly regretted by the Cleveland Railway and by all who had known and respected him for his pleasing personality and his admirable qualities as a man. Mr. Grant held the position of foreman of the Berea Garage for several years before his death, and under his leadership many new and improved shop practices were installed. During his association with the Cleveland Railway, which began in August, 1926, he frequently showed a great deal of ingenuity as typified in his contribution to the contest which won the capital individual prize. Mr. Grant is survived by his wife, Mrs. Florence Grant, Lakewood, Ohio.



Certificate of merit presented to Ottawa Electric Railway Company

Digitized by Google

Won by Cleveland Railway

Third Period Prizes Go to Ottawa and Cleveland

Leonard S. Rose

(In Oval)
J. Mondoux

William Anthony

AWARDS for the third period of the Maintenance Contest were divided between the Ottawa Electric Railway and the Cleveland Railway. In the Department of Rolling Stock and Shops the prize was given to J. Mondoux for his article describing a scheme to increase the life of truck jaws, as practiced in the shops of the Ottawa Railway. To William Anthony, general track foreman of the Cleveland Railway, was awarded the quarterly prize in the Department of Way and Structures for his entry entitled "Levelling Bar Facilitates Track Alignment." Both of these items appeared in the September issue of the JOURNAL. Another Cleveland Railway representative was awarded one of the prizes for his contribution in the Buses and Garage Department describing a connecting-rod boring tool. This item was submitted by Leonard S. Rose, assistant superintendent motor coach department, who has once before won a prize in this department.

For the second time in this contest, the judges were compelled to withhold the prize for the Electrical and Line Department because of the lack of deserving contributions. This situation should spur electrical men to increase their contributions in the next contest, beginning Nov. 1, 1930.

J. Mondoux

AFTER having served five years with the Engineering Corps of the Canadian Expeditionary Force in France, J. Mondoux returned to Canada in 1919 to join the repair department of the Ottawa Electric Railway. He has been in that department since, engaged principally in the repair and overhaul of car trucks and riggings. Recognizing that in no other department of an electric railway can an alert workman accomplish more to facilitate and improve the quality of workmanship by the development of ingenious devices and shop practices, Mr. Mondoux has always taken every opportunity to study shop methods with the hope of developing some new idea which would result in a saving of labor or cost. His efforts have often produced welcomed improvements, one of which is the scheme for lengthening the life of truck jaws, which is described in his winning contribution to the Maintenance Contest.

William Anthony

ATTRACTED by the opportunities to be obtained in a rapidly growing nation, William Anthony left his native land of Greece in 1908 as a youth of twenty, and arrived in the United States equipped with a sound training obtained at the College of Pojrogos. He mastered the English language in a short time. Mr. Anthony possesses the tenacity characteristic of his race. This tenacity has manifested itself through two decades of varied experience, finally bringing him to the Cleveland Railway as a sub-foreman and enabling him to advance to his present position of general track foreman in four months. His first opportunity was obtained with the Westinghouse Electric & Manufacturing Company with which he remained seven years to rise to the position of inspector of shells manufactured for the English Government during the first two years of the war. In 1916, Mr. Anthony became the employment agent for the Lorain Tube Mills, and it was with that company that he began his long association with track construction. Previous to his entering the employ of the Cleveland Railway, he had been track foreman of the Hunkin Conkey Company for one year, and held a similar position with the Lake Shore Electric Railway for six years.

Leonard S. Rose

WITH a background of wide experience in the field of maintenance of transportation equipment, Leonard S. Rose came to the Cleveland Railway in 1925 to assume the position of assistant superintendent of the motor coach department, in charge of maintenance. He was graduated from the School of Science and Technology of the Pratt Institute, and began his career as an inspector of substation construction with the Brooklyn Edison Company soon after graduation. Attracted to the automotive field, Mr. Rose became associated with the Packard Motor Company, which he served for seven years, five of which were spent in the capacity of technical service manager. In the following two years he filled the position of service manager in the New York State district for the White Company. His affiliation with the Cleveland Railway was preceded by a period with the Long Island Railroad as supervisor of maintenance of shop electrical equipment.

New Contest Begins Nov. 1!

Digitized by Google

Practical MAINTENANCE IDEAS

MANY ingenious devices and maintenance practices have been adopted by the Cleveland Railway. This company submitted a substantially larger number of items than any other railway in ELECTRIC RAILWAY JOURNAL Maintenance Contest ended July 31, 1930. On this and following pages are presented a variety of maintenance ideas developed by the company.

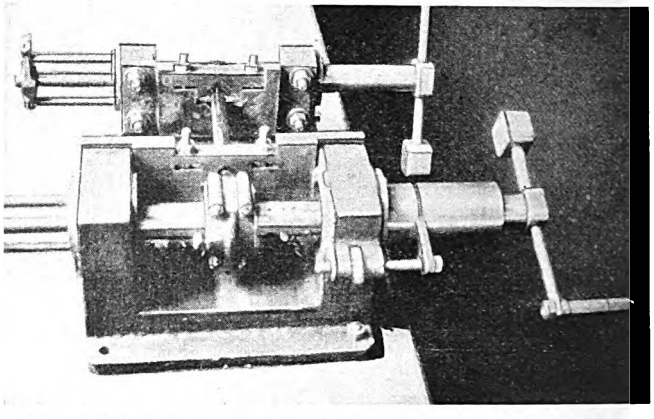
Connecting Rod Boring Tool*

BY L. ROSE
Cleveland Railway

FOR the repair and overhaul of connecting rods, the Cleveland Railway has designed a machine which is simple in operation and fast enough, in comparison with the customary shop method, to pay for itself in a short period of time. The machine consists of a body casting equipped with a sliding table. On both the body casting and sliding table are located V-type clamping plates so arranged as to permit considerable vertical adjustment and $\frac{1}{16}$-in. lateral adjustment. These V-plates are used to grip the connecting rods and are adjustable to take any standard size rod. Rods of varying lengths are accommodated by means of the sliding feature on the table. A constant length for each type rod is maintained by removable taper dowel pins through the table into the base.

Two special boring bars are used. Both bars are equipped with fly cutters and a square slot for the insertion of a two-blade Kelly reamer. The larger bar is also drilled for side cut-off in beveling tools. A large shoulder is provided on each of the bars so that cutters may be set to size and not disturbed by the removal of the bar during the boring of an entire set of rods. Provision for adjustment of side cut-off is had by means of a knurled nut and the guide which works in the groove of the large bar. This adjustment is disconnected when using fly cutters, and feed is accomplished by means of the 80 pitch screws pinned to the end of the cutter bars.

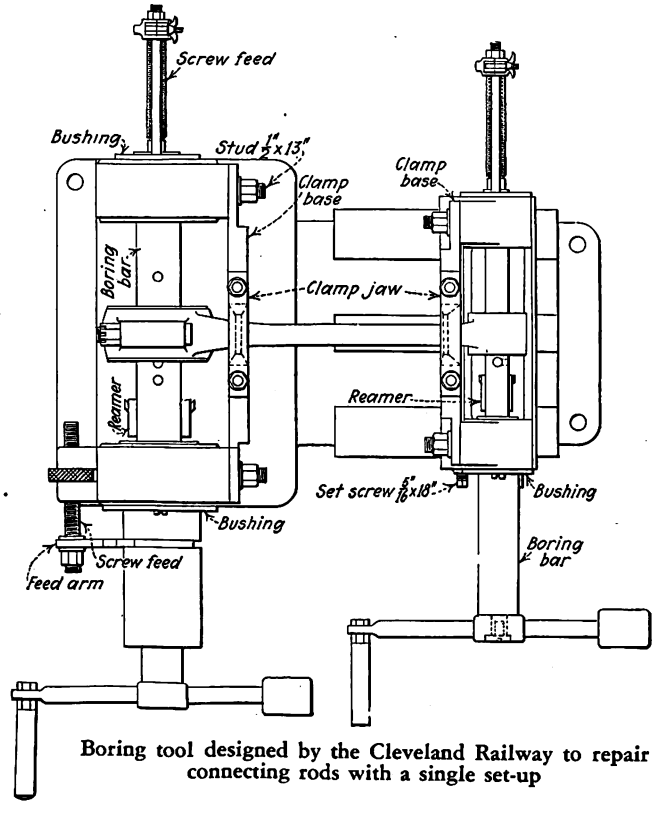
Initial location and mounting are obtained by the use of a Champion expansion mandrel which is mounted in the unbored wrist pin bushing. This centers the connecting rod in the sliding table and places it in a position at right angles to the wrist pin bushing. A height-controlling pin of a specified dimension for each type of rod is used under the larger end of the rod to locate the center accurately.



After initial adjustments have been made on this machine, an entire set of connecting rods can be bored without removal of bars

In overhauling a rod, the V blocks are disassembled, the slide adjusted to the predetermined setting and the proper height pin inserted in the base. After the rod is laid in the V, the expansion bushing is inserted and pulled up tightly. The rod is free to move laterally for centering with the large V plate. The plates are loosened so that they are free to move on the clamping nuts. The V is then tightened until a tight bearing is obtained on the rod, after which the clamping plate nuts are given a final tightening and the expansion mandrel is removed. The bar is then ready for boring.

The boring bars are next installed and through cuts to size are made in the regular manner. By using the reamers, both the rough and finishing cuts may be taken at the same time. This, however, requires accurate setting up and should be done only by skilled workmen. The amount of time involved in resetting the tool and making a finishing cut with a fly cutter after having taken the roughened cut is slight. After the bearings



Boring tool designed by the Cleveland Railway to repair connecting rods with a single set-up

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Digitized by Google

Developed by the Cleveland Railway

are bored, side cut-off tools are placed in the two holes provided in the larger bar and the sides of the babbitt bearing are faced and cut to the proper radius in the same operation.

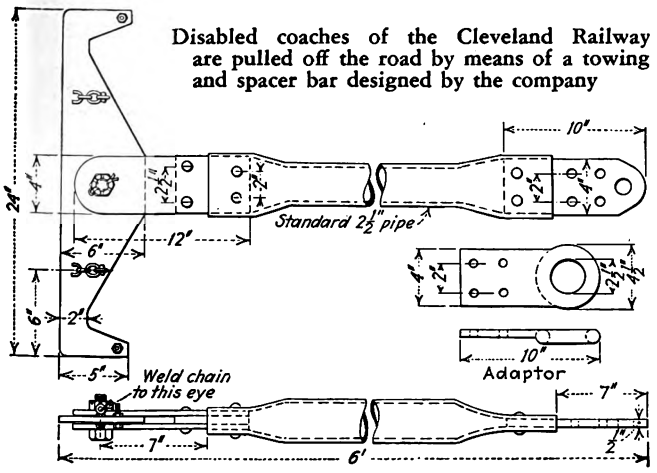
It has been found that the method of mounting described above gives practically no warping in the rod, so that the bearings which are bored parallel remain so after the rod is removed from the fixture. By clamping and boring in this manner it is not necessary to realign the bushings after machining operations have been completed.

Towing and Spacer Bar for Disabled Buses*

By William Piwonka
Engineer Cleveland Railway

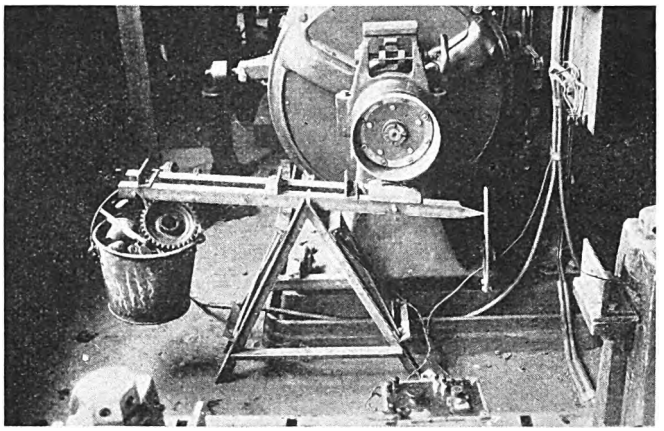
TOWING disabled coaches to their garages is of major importance where the disabled units must be removed from the road as rapidly and safely as possible. It is particularly difficult when the disabled coach is without brakes or is being run in on dummy wheels to protect a damaged rear axle. For this purpose a towing bar designed by the Cleveland Railway is being used with success. All garages of the railway will be equipped with them as standard emergency equipment.

One purpose of the design was to get a towing bar which could be rapidly and easily fastened to the bumper, front axle or front frame support member of a coach



Disabled coaches of the Cleveland Railway are pulled off the road by means of a towing and spacer bar designed by the company

or a truck. A small turning radius was also required together with a good factor of safety and ease of installation. Due to differences in the construction of various makes of coaches, the conventional clamping arrangement could not be used. To meet these requirements a pipe spacer bar is used. A swivel plate on one end is fastened to the front axle, bumper or front cross-member of the frame of the disabled vehicle by wrapping the two lengths of chain about the axle or bumper and securing them to bolts in each corner of the plate. The detachable adapter on the other end of the bar permits its use with all trucks owned by the company. No attempt was made to use the bar to steer the rear coach automatically.



Service conditions are simulated by this device for testing brake lining specimens

Brake Lining Selected by Test Results*

By Hoy Stevens
Superintendent of Maintenance Cleveland Railway

FACTORS influencing the service of brake lining for use on motor coaches have been carefully studied on the Cleveland Railway by supplementing the data obtained from actual service by laboratory tests and observations. In this manner, it has been possible to analyze the physical characteristics of the material and to judge what will happen under certain predetermined operating conditions.

The laboratory tests are made with an apparatus which consists of a brake drum mounted on one end of a dynamometer and a small stand equipped with a pivoted lever as shown in the illustration. The material to be tested is mounted on the pad which is at one end of the lever. Specimens 1 in. square are used and a thermocouple is inserted in a hole in the specimen to record the heat developed by the friction of material and brake drum. Pressure is applied by means of weights hung at one end of the lever with a 2:1 ratio of arms. In this manner, a 100 lb. weight will produce a pressure of 200 lb. per sq.in. on the brake drum when 1 sq.in. of lining is used as a test specimen. A pointer has been

Tests determine actual rate of wear of various linings

provided to indicate roughly the amount of wear, but it has been found desirable to measure this wear with a micrometer after the test is finished. Tests may be made for a large range of temperatures by regulating the flow of cooling water to a flange welded on the inside of the drum.

*Submitted in Electric Railway Journal Prize Contest.

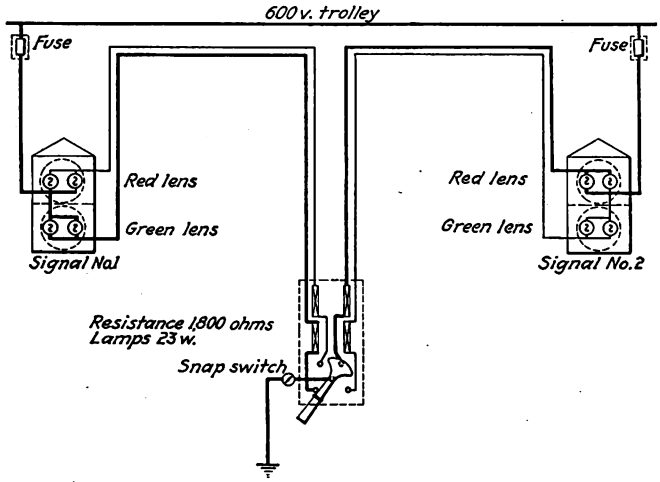
Digitized by Google

In testing the specimen, the coefficient of friction, and how it is affected by oil, grease or water, is determined at various temperatures. These qualities, together with the measured rate of wear, are important factors in the selection of brake lining material. For instance, in a coach where the brakes have a large factor of safety, so that the wheels can easily be locked by the operator, it may be advantageous to use a lining with a low coefficient of friction and thereby obtain greater life from the lining. On the other hand, where the braking ability is on the ragged edge it may be advisable to sacrifice lining life to increase the braking ability by using a material with a relatively high coefficient of friction.

Center Control for Temporary Block Signal*

By H. A. Brown
Foreman Return Circuit, Switch and Signal Division Cleveland Railway

WHEN cars are operated both ways on a single track during construction jobs, the Cleveland Railway uses a single center control block signal. The signal consists of a two-color light box at each end of the track section to be controlled, together with a three-position switch placed in the middle of the block and



Block signals manually operated by a flagman in the center of the block protect tracks during construction on the Cleveland Railway lines

operated manually by a flagman. The arrangement of circuits is shown in the accompanying diagram.

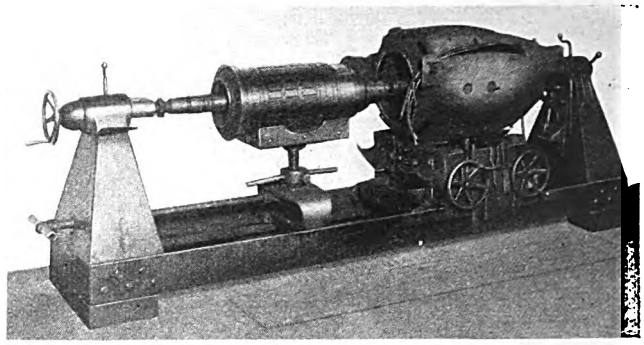
By throwing the switch to the right, a red light is displayed at one end of the block, and a green light at the other. When the switch is thrown to the left, the colors of the lights at the two ends of the block are reversed. By placing the switch in the center position, red lights are displayed at both ends of the block, enabling the flagman to control car movements if trouble occurs within the signalized area. A snap switch permits opening the circuit when the blocks are not in service.

The signals are simple and portable, so that two men may install a complete set in five hours. They replace the old methods, in which two or three men acted as flagmen, or block signals were manually operated at the end of the block by the car crews, or automatic signals were installed for use with trolley contactors.

**Submitted in* Electric Railway Journal *Prize Contest.*

Convenient Machine for Armature Removal*

By Terance Scullin
Superintendent Buildings and Equipment Cleveland Railway



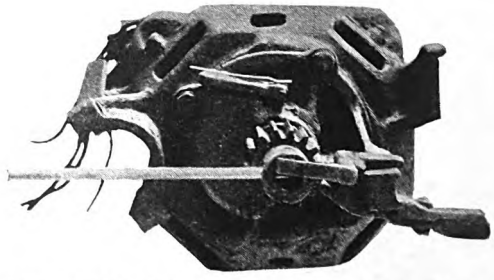
One-man machine which removes armatures from box-frame motors

ARMATURES are removed quickly and easily from motors by means of a special machine at the Harvard Shops of the Cleveland Railway. It consists of a bed with supports at both ends to hold the armature and motor box in center. Two cradles are provided, one for the motor box and another for the armature. A square thread elevator with lever attachment is used for raising and lowering the armature to and from the position of centering. The motor is placed on the motor cradle and centered. By means of two wheels the motor cradle is raised and lowered to the desired position. The motor box frame is then carried off on to the long arm of the machine and the armature cradle brought into position to receive the armature. Only one man is required for the operation.

Dog Holds Armature Pinion*

By M. J. Leary
Assistant Superintendent Buildings and Equipment Cleveland Railway

REMOVAL or tightening of the nut holding the motor pinions on the armature shaft has been facilitated greatly by tools made at the Harvard shops of the Cleveland Railway. A special tool, shown in the illustration, is placed on the gearcase bracket after the pinion wrench has been put on the nut. The device works like a ratchet, allowing shorter bites to be taken. The device keeps the wrench from slipping off the nut, and obviates any danger of the workman's being injured. Only one man is necessary to remove or replace the pinion nut. Pre-



Ratchet dogs developed in Cleveland permit one man to remove or tighten pinion nuts without chance of injury

Digitized by Google

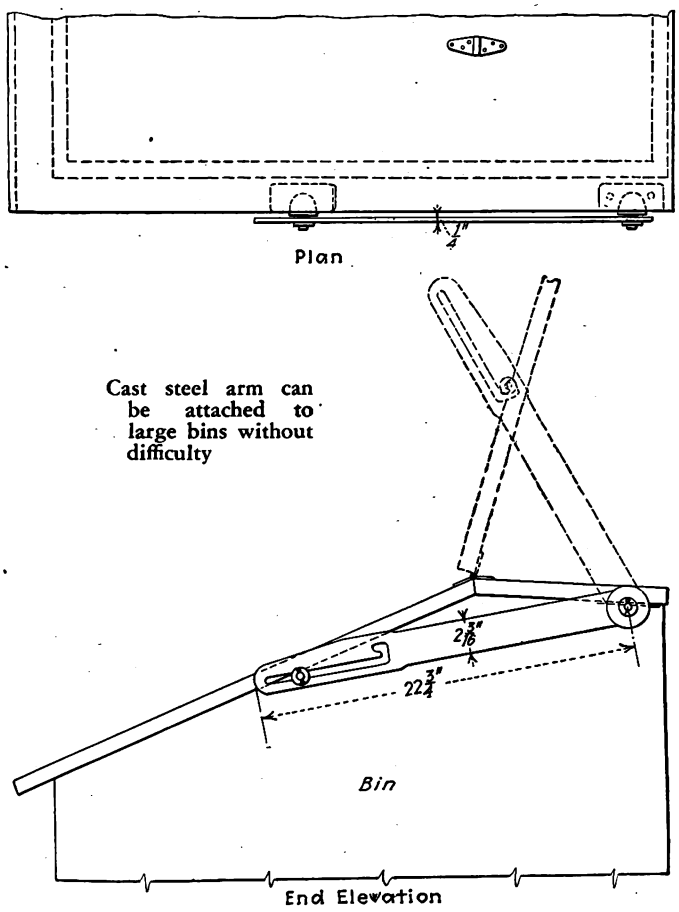
viously, an ordinary pinion nut wrench was used, pressure being placed on it by means of a long bar. One man held the bar, while another tried to keep the wrench from slipping off. This method was awkward. Frequently the wrench would slip off, and the bar would fall on a man and injure him. Both right and left-hand dogs are made up, so that they can be used for loosening or tightening the pinion nuts. The cost of the two is approximately $5.

Safety Arm for Coal and Sand Bin Lids*

By Joseph App
Mechanical Department Cleveland Railway

SAND and coal supply bins are located at the ends of the various lines of the Cleveland Railway. These boxes have large heavy lids which, when opened, rest in an almost vertical position against an upright on the back of the box. A sudden wind has on several occasions slammed this lid shut, injuring a trainman.

To prevent the unexpected slamming of these lids, a safety arm has been designed which locks them open. It

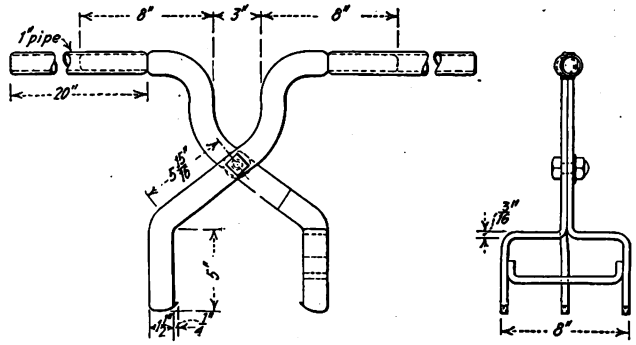


Cast steel arm can be attached to large bins without difficulty

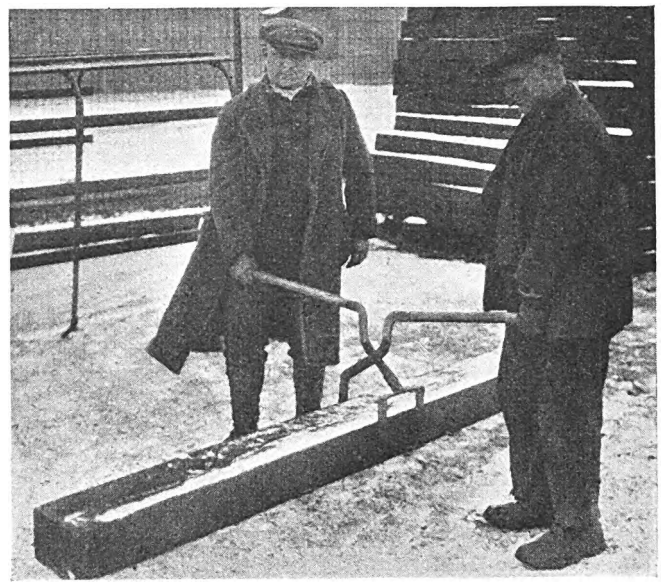
consists of a steel casting, $22\frac{3}{4}$x$2\frac{1}{2}$x$\frac{1}{4}$ in. with an 8-in. L-shaped slot near one end. The slot allows free movement of a pivot of cast steel which is fastened to the lid. The other end is pivoted at the side and near the back of the box. When the lid is raised the lid pivot slides back to the foot of the L-slot to a depression which locks the lid securely in the open position. To shut the lid, it is necessary only to work the pivot back into the slide by a slight movement of the lid.

Treated Ties Safely Handled*

By R. B. Evans
Assistant Superintendent of Construction Cleveland Railway



Three point grip is obtained without penetrating below the treated depth of tie



Tongs enable two men to handle tie with ease and affords greater protection against skin irritation

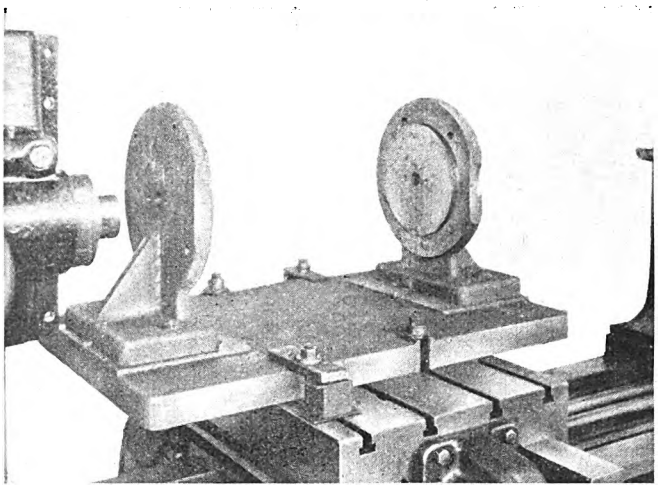
GREATER facility in the handling of ties has been obtained on the Cleveland Railway by the use of tongs which have been cheaply made in the shop. The tongs have three prongs, two of which grip the tie on one side and the third on the opposite side, making it easy for two men to balance the weight. The tongs are made of cold-rolled steel, and are joined at the pivot point by a $\frac{5}{8}$-in. bolt. The handles are of ordinary 1-in. wrought-iron pipe to which the ends of the tongs are forged and welded. The wood is gripped by stub points which do not enter far enough to pass through the treated zone and yet they are sufficiently deep to permit a firm grip without danger of the tie slipping from the tong.

The use of this tool has materially speeded up the handling of treated ties and has made it possible for two men to handle them with safety. Another advantage in the handling of treated ties with tongs lies in reducing the danger of sore eyes and skin irritations caused by contact with the creosote.

The danger of skin irritation to men handling ties in a storage yard is a serious one and one which affects to a large extent the speed with which ties may be piled. By greatly reducing this danger the men will go about the work with a greater freedom of action.

*Submitted in Electric Railway Journal *Prize Contest.*

Digitized by Google



This device holds a motor shell in position for boring out the axle bearing seats

Simplified Boring of Motor Axle Bearing Seats*

By John Greer
Assistant Foreman Mechanical Department
Cleveland Railway

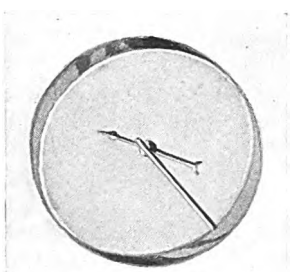
SAVING of nearly four-fifths of the time required to set up a motor shell for boring out the axle bearing seats was accomplished by a jig designed and built in the Harvard Shops of the Cleveland Railway. The jig consists of a bedplate and two sliding vertical ends. The latter have holes spaced the same as those in the ends of the motor shell for attachment of the end housings.

After the motor frame has been built up by welding it is lifted in place by means of a crane and bolted to the jig. It is then ready for the reboring after 2½ hours work, whereas by the old method 12 hours were necessary. The cost of the jig was $55.

Two-faced Compass Determines Motor Field Polarity*

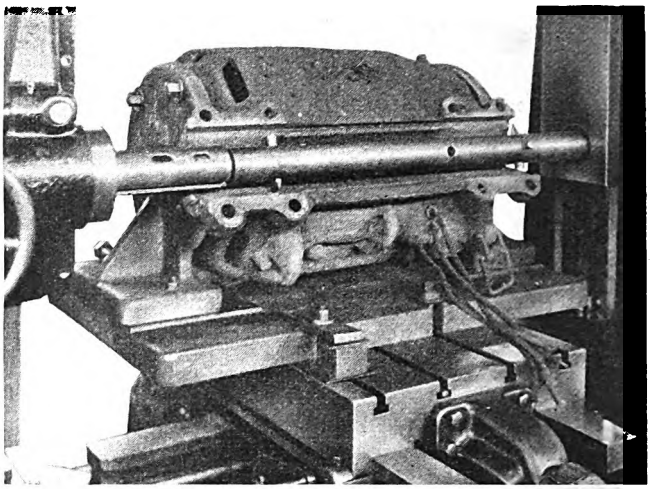
By R. Dumke
Foreman Mechanical Department
Cleveland Railway

POLARITY of motor fields is tested at the Harvard shops of the Cleveland Railway by a specially constructed compass. When the field polarity of the motors of a car over the pit must be determined, the simplest method is by means of an ordinary compass. As there



Compass with glass on both sides makes it easy to determine motor field polarity in Cleveland Railway shops

is only one open face it is difficult and, in some positions, impossible to see the compass. The special compass was made with glass on both faces, so that it can be viewed from any angle. The center spindle which supports the needle is held in place by a single narrow brace soldered to the rim.

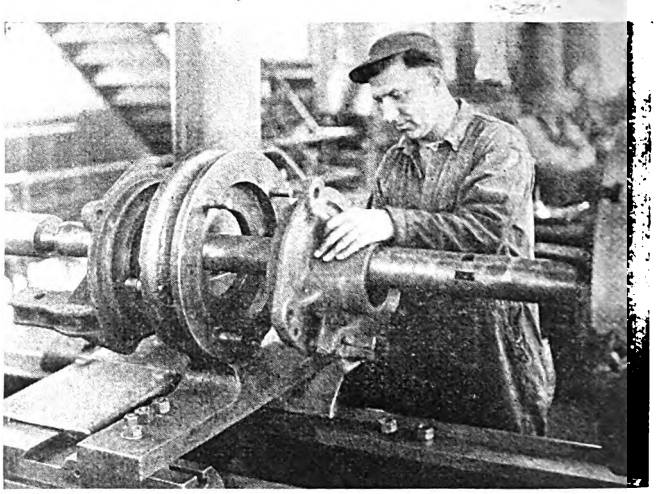


A motor in place ready for boring in the jig designed by the Cleveland Railway

Oversize Bearing Housings Bored in Jig*

By Martin F. Niederst
Foreman Mechanical Department
Cleveland Railway

FOR boring armature bearing housings which have become worn in service, and in which oversize bearings must be used, the Cleveland Railway has designed and built a jig, which is used in the Harvard shops.



By use of a special jig developed by the Cleveland Railway two end housings may be bored at once

The jig consists essentially of a ring with studs located in positions similar to those of the motor shell, so that the housings for the two ends of the motor can be bored out at once, thus insuring that the bearings will be in line.

Use of the jig saves considerable time in making the set-up, and since under the old method the housings were bored one at a time it was difficult to line up the bearings. In addition, the method saves considerable time and labor. The cost of the jig was about $35.

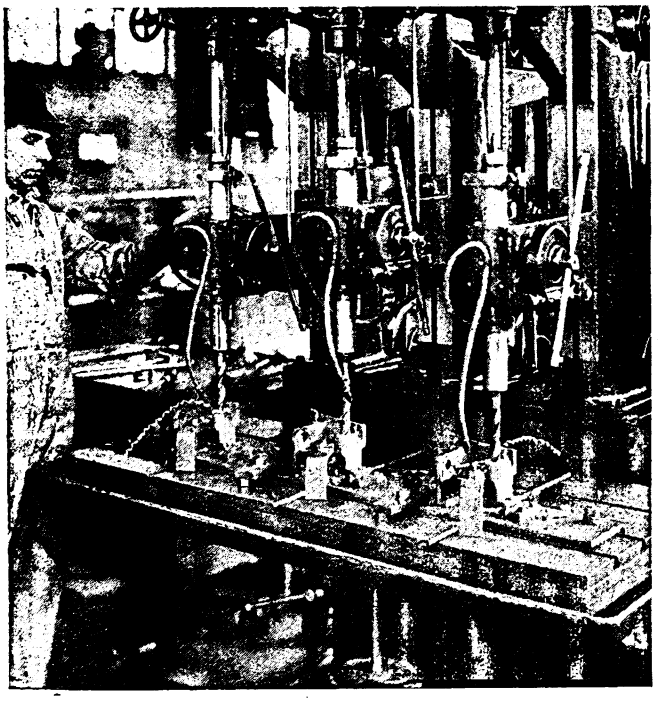
**Submitted in* Electric Railway Journal *Prize Contest.*

Digitized by Google

Ingenious Jig Speeds Brake Head Drilling*

By Martin F. Niederst
Foreman Mechanical Department
Cleveland Railway

BRAKE heads are drilled at the Harvard shops of the Cleveland Railway in an ingenious jig developed by the mechanical department. This jig comprises a set of clamps so arranged that three brake heads can be placed in position for immediate drilling. A workman can insert one brake head in the first space of the jig and start this drill; then he can do the same for the other



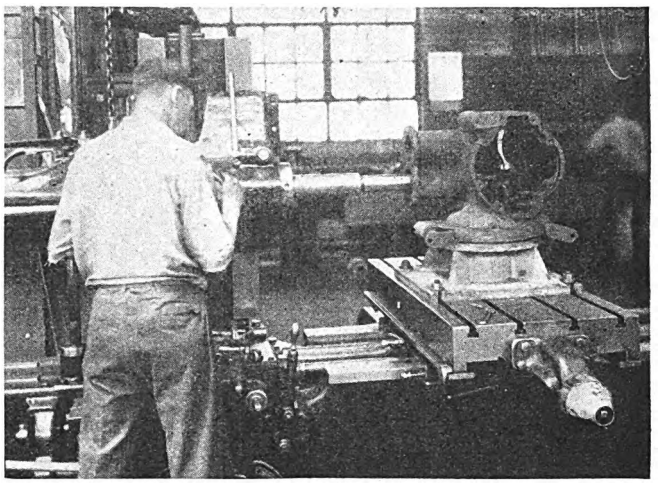
Three brake heads are drilled progressively in one jig in the Cleveland Railway shops

two drills in turn. By the time the third head is clamped in place the first one is completed and he can start over again with drill number one. In this manner he is able to drill brake heads continuously. With the aid of this jig, one man can do three times the work done under the old method of drilling. The approximate cost of one of these jigs is $12.50.

Cylinder Boring Device for Air Compressor*

By Ray C. Sohl
Chief Engineer Cleveland Railway

FOR boring worn cylinders of air compressors, which are to be rebrushed, a jig has been designed and built at the Harvard shops of the Cleveland Railway. It consists of a short cylindrical casting, the face plate of which has holes drilled in the same relative positions as those on the compressor body casting. The latter is bolted in place on the jig, and is held securely in position. The base plate of the milling machine is fitted with



Milling machine fitted with jig to facilitate boring of compressor cylinders

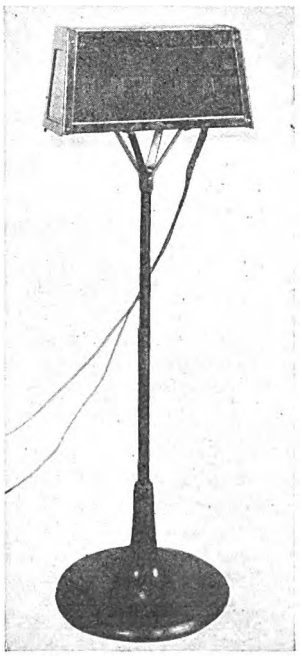
keyways and locations for the studs to hold the jig firmly in position.

By means of this jig the boring can be done more accurately, and, at the same time, handling is reduced to a minimum.

Blinker Light Protects Linemen on Night Work*

By Christ Reinker
General Foreman Mechanical Department
Cleveland Railway

PROTECTION of linemen while working at night on the Cleveland Railway system is afforded by a blinker light designed and built in the shops. A sheet metal hood fitted with red glass is supported on a telescopic pipe stand with a heavy cast iron base. With a series of holes and a key, the light may be set at any desired height, or the stand may be collapsed into a small space for transportation on the truck. Five 110-volt, 23-watt Mazda lamps are connected in series, one socket being fitted with a Diamond flasher button. This device can be lighted directly from the trolley, and with its flashing red light is an effective warning to approaching traffic. The hood is inclosed on the top and four sides, so that it is entirely weatherproof. The bottom is open, affording good ventilation and making replacement of burned-out lamps an easy matter. While simple in design, the appearance is attractive. The lamps and stand are readily portable. It cost about $7 to make.



Linemen in Cleveland are protected by this flasher which shows an intermittent red light

*Submitted in Electric Railway Journal *Prize Contest.*

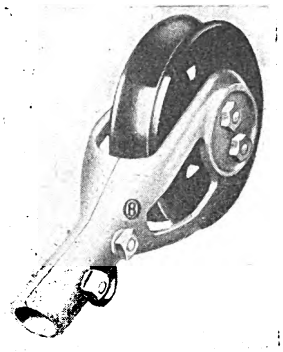
Digitized by Google

NEW PRODUCTS for the Railways' Use

Trolley Wheel Lubricated With Composition Washer

IMPROVED lubrication with adequate current capacity is incorporated in the improved trolley wheel made by the Ohio Brass Company, Mansfield, Ohio. A washer of a composition of copper and graphite is now used in place of the fiber washer between the ends of the hub and the harp. The new washer is a conductor of electricity, whereas that formerly used acted as an insulator.

Most of the current now passes from the hub to the harp through the washer instead of through the



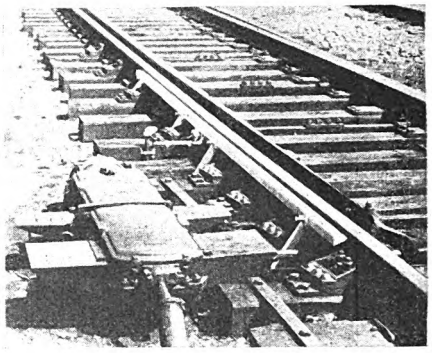
Lubricating washers conduct current around axle from trolley wheel hub to harp

axle, thus eliminating the possibility of pitting the axle. In addition to its conducting quality, this new washer acts as a lubricant, reducing wear and, to a large extent, eliminating end play in the wheel.

The harp is designed to protect the flanges of the wheel from damage when a flying trolley pole strikes a cross span or bridge structure.

Switch Heater Supplied With Gas Fuel

SWITCH heaters for melting snow and ice, using gas as fuel and ignited from one central point, have been recently announced by the Chausse Oil Burner Company of Elkhart, Ind. The gas, either artificial or natural, can be turned on and ignited from one point, such as a signal tower. This eliminates all manual requirements for starting switch heaters and offers a centrally controlled equipment which can be operated at a low cost.



Remote control of igniter and fuel supply is an attractive feature of new switch heater

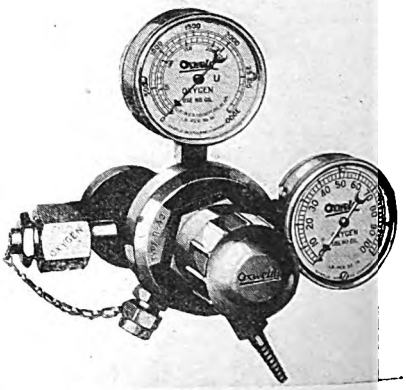
The switch heaters are 14 ft. long, placed close to the ball of the rail, and are held in position by substantial malleable-iron clamps which are attached to the ties. Gas is admitted at the center of the heater and distributed through a specially designed combustion chamber. Practically no flame is visible and consequently there is no interference with low switch targets. An igniter of michrome wire wound on a lava spool is attached at the center in a substantial steel housing and connected with the central operating switch. These heaters normally consume about 75 cu.ft. of gas per hour and the igniter is rated at 220 watts. During severe storms the heater can be left turned on constantly at a very low expense, or it can be left on for a few minutes in starting and then periodically switched on by the tower man. The rail is kept at a temperature well above the melting point of snow and ice but not sufficiently hot to affect its texture. Actually, there is sufficient heat rising above the track to melt the snow before it reaches the rail and consequently there is a path, a foot wide, on each side of the rail free of snow. The heat is sufficient to prevent accumulation of ice, and at times will keep clear the entire area between the rails. It can be successfully used on remote control crossings provided there is a source of domestic gas near by.

Pressure Regulator for Oxy-Acetylene Apparatus

FREEDOM from fluctuation of acetylene gas pressure is obtained by means of a two-stage pressure reduction device recently introduced by the Oxweld Acetylene Company. This two-stage reduction is accomplished through two separate and independent sets of diaphragms, valves and springs. The full cylinder pressure of 2,000 lb. enters the regulator through a stem-type valve and is controlled by the first stage diaphragm. In this stage, the pressure is reduced to less than 250 lb. per sq.in. This pressure will be constant for any one regulator, but varies somewhat with different regulators. The pressure here is non-adjustable.

The oxygen then passes from this first reduction assembly to a second stem-type valve and a diaphragm assembly where the pressure is reduced to the working pressure desired by the operator. This pressure is regulated by the operator by means of the adjusting screw.

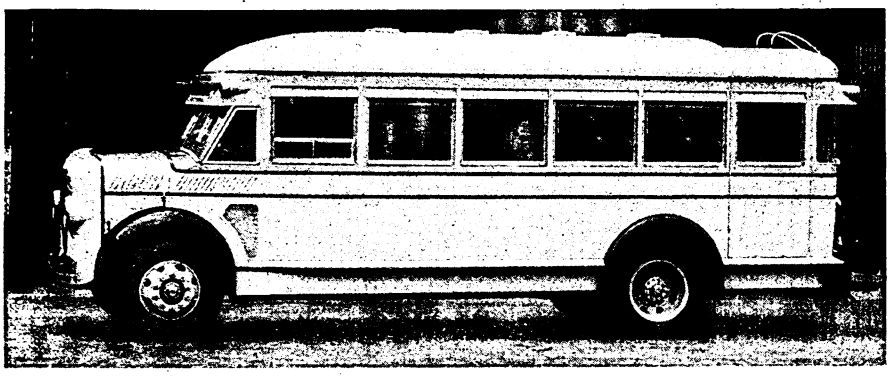
Instead of the usual handle-type pressure-adjusting screw found on all other Oxweld regulators, there



Oxygen regulator equipped with a gage for tank pressure and a gage for working pressure

has been substituted a screw with a ribbed cap. The claim for this change in external design is not only a neater and more compact appearance, but also the avoidance of possibility of breakage as there are no projections on the handle to be bent accidentally. This new type adjusting screw is of smaller diameter than the body of the regulator itself, so that it is easier to pack for moving.

Digitized by Google

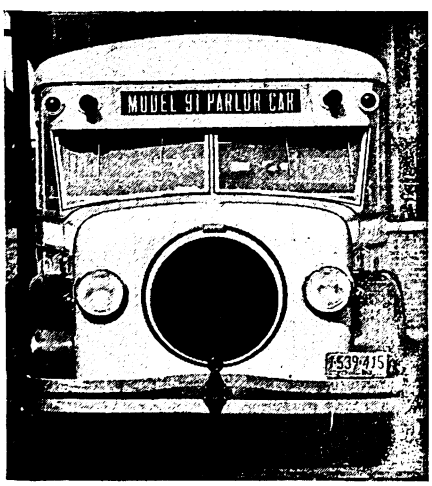


The new Fargo bus has been designed for compactness and speed. The power plant extends within the body and the driver sits at the left of the engine

Fargo 8-Cylinder Bus Placed on Market

RADICAL departures from standard construction are found in two new models just brought out by the Fargo Motor Corporation of Detroit. the recently organized bus and truck division of the Chrysler Corporation. While these units are to take the place of the former Dodge line of buses, and incorporate some of the features contained in it, they represent an entirely new design.

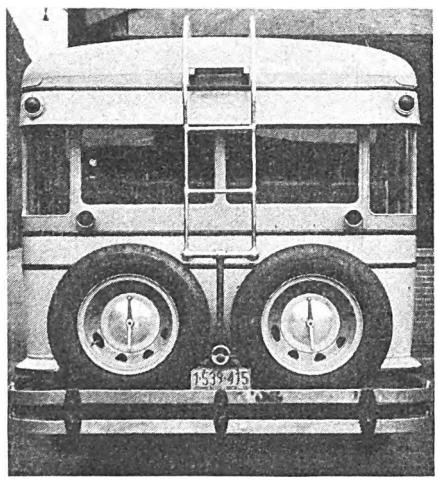
Perhaps the most striking change is the appearance of the front, which has been so shaped as to reduce wind resistance. The hood is shortened and has been rounded, with a gradual taper to meet the side panels. The windshield is tilted to meet the curve of the roof. The same body and chassis are used for a parlor car type and a city service type bus. The two, however, have different finish and appointments.



A broad, curved hood and inclined windshield have been adopted to reduce wind resistance

The engine is an 8-cylinder, L-head model, adapted for bus service from the Chrysler Imperial engine. It is mounted on a chassis built with 10x$\frac{3}{16}$-in. hot-rolled steel channels, with six cross members. Specifications of the engine and equipment are given in an accompanying table.

On account of the shortened hood the power plant has been extended backward within the body. The driver's seat has been placed alongside the engine, and the steering wheel is mounted well forward on the frame. All controls, except the horn button, which is on the steering post, are on the dash directly in front of the driver. A door in the dash gives access to the engine from inside the body, while hoods at the front can be raised to uncover the fan, generator and belt drive.

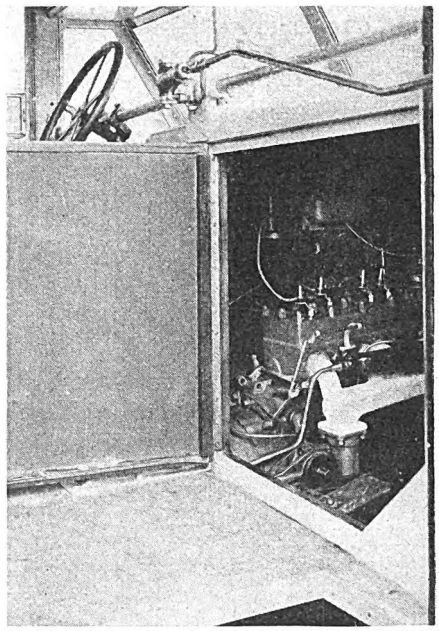


The depressed baggage space on top is reached by a substantial ladder

An unusual feature is that by taking off the hood, uncoupling the universal joint, gear shift lever and control wires, only four caps surrounding the lugs on the engine need be removed so that the engine can be slid forward on supporting rails and lifted from the chassis by a crane.

Moving the driver forward gives 20 in. additional length inside the body for passengers and permits wider spacing of seats, particularly at the wheelhouse. Being at the extreme left, the driver is in a better position for driving in traffic and there is more room for passenger movement in and out of the bus.

Two distinct bodies are included in the line. The parlor car has seats for 21 passengers, with four additional aisle seats available. The interior finish is modernistic, the motif being carried throughout. An overhead baggage rack extends the length of the bus on either side. An aluminum alloy rail at the edge acts as a hand rail. In addition, there is an outside luggage loft recessed into the roof, which is reached by a ladder at the back end.



Accessibility to the engine is obtained by a door at the right of the driver's seat. The entire power plant can also be slid forward readily and removed with a crane

The city type bus also has 21 seats, but they are spaced on 29½-in. centers to provide greater standing room, making it possible to carry a considerably greater rush-hour load than usual. Doors are of the double jackknife type, folding inward. A rear exit door is placed behind the rear axle. Both doors are operated by

Digitized by Google

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Brooklyn, N. Y.—The service bureau of the Transit Commission has recommended the granting of the application of the Brooklyn & Queens Transit Corporation, to place one-man surface cars on eight lines in Brooklyn and Queens.

✦

Jacksonville, Fla.—The proposed new franchise for the Jacksonville Traction Company is being revamped to include certain things agreed to at a conference held several weeks ago between members of the special franchise committee of City Council and Peter O. Knight, counsel for the Stone & Webster interests. Meanwhile, the committee and the company are awaiting a report from engineers named to determine how much money will be required to rehabilitate the property.

✦

St. Louis, Mo. — To provide greater comfort for its night passengers, Illinois Terminal Railroad System has installed, on its electric line between St. Louis and Peoria, the latest improvement in travel service—the new single bedroom sleeping cars. There are nine single rooms in each car all equipped with suite arrangement. Each room contains a large bed, toilet facilities, folding writing table, upholstered chair, electric fan, ample lighting arrangement.

✦

Michigan City, Ind. — South Shore Line shippers are now provided with direct interchange facilities with the Pennsylvania Railroad. With completion of the electric overhead work early in September, the interchange, located west of Gary, is now ready for service.

✦

San Francisco, Cal. — The Board of Supervisors on Sept. 19 voted to submit to the people a charter amendment extending the franchise of the Market Street Railway 25 years. It was an obligatory step, sufficient signatures to a petition to have the amendment put on the ballot having been obtained.

✦

Brooklyn, N. Y. — The Brooklyn & Queens Transit Corporation, after successful operation of trolley buses, has filed a petition for extension of the Cortelyou Road line through Flatbush section to New Utrecht Avenue.

✦

Albany, Ore.—Rails will be laid on the new Oregon Electric extension east of Lebanon before 1931, W. F. Turner, president, and A. J. Witchell, chief engineer of the Spokane, Portland & Seattle and Oregon Electric railroads, said on Sept. 17 before leaving for Portland following an inspection trip over the new construction work.

✦

Camden, N. J.—New records were established for carrying bus passengers to seashore resorts in the Southern division, Public Service Co-ordinated Transport, over the Labor Day week-end. More than 35,000 passengers were hauled without an accident.

(Late News Continued on Page 656)

Additional Time Needed for Toledo Grant Revamping

Negotiations looking to a revamping of the Milner service-at-cost ordinance in Toledo, Ohio, have reached a deadlock. The board of street railway control has indicated that sufficient time is not available in which to go over the franchise carefully, and recommends renewal of the Milner grant for two years. Provisions for such renewal are contained in the ordinance.

Company officials have suggested that the Community Traction Company be awarded an exclusive franchise for the rest of the time under the present grant, and have offered in exchange flexible fare provisions to give school children a 5-cent fare, permit or weekly passes and other special fares designed to stimulate riding.

Board of control members recommended several fundamental changes in a letter to Mayor W. T. Jackson on April 24. They suggested scaling down the capital value because of the $2,500,000 abandonments, refinancing of preferred stock at 7 per cent, a change to make the sinking fund dependent upon earnings rather than a recapture of capital as claimed at present, power to the board to authorize extensions of bus service, and authority for the commissioner to approve all contracts. The board sees no way out of the $812,000 accrued debt due to the deficit in the stabilizing fund, on which no interest is being charged for ten years.

August Earnings Off

Three steps are open to the city in the matter now: (1) Renewal for any period up to ten years; (2) substitution of a remodeled ordinance; (3) amortization of the property over the next fifteen years as provided by the present ordinance. Renewal could be considered later during this amortization period. To renew or revamp the ordinance requires a vote of the electors.

Total revenue of the Community Traction Company, Toledo, Ohio, in August was $215,358, the lowest point reached for several years. This represented a drop of about $80,000 under the similar month of last year. Operating costs were reduced about $29,000. After all charges in keeping with the Milner ordinance, the deficit charged to the stabilizing fund was $63,003. All individual car lines showed losses but two of the bus lines showed a slight profit. The new Maumee Valley belt line showed a slight loss. The railway ratio of expense to operating revenue was 88.418 per cent and the coach ratio 96.977 per cent. In first eight months in Toledo 28,969,941 passengers were carried compared with 36,232,810 for the similar period last year.

COMING MEETINGS

Sept. 29-Oct. 4—National Safety Council Convention, Pittsburgh.

Oct. 6-11—Sixth International Road Congress, Washington.

Oct. 9-11 — Midwest Electric Railway Association, Miami, Okla.

Oct. 22-24—National Transportation Meeting of the Society of Automotive Engineers, Pittsburgh, Pa.

Oct. 29-30—Iowa Electric Railway Association, Des Moines, Iowa.

Nov. 12-15—National Association of Railroad and Public Utility Commissioners, annual meeting, Charleston, S. C.

Ticket Plan in Effect a Year in St. Louis

Results of the first year of the use of weekly commutation tickets by the St. Louis Public Service Company show that the average fare for ticket riders was only 7½ cents or less than the prevailing rate of fare when the ticket system was put into effect in August, 1929.

During the year more than 7,500,000 tickets were sold and an average of fifteen rides was taken on each ticket. The total rides, including 5-cent fares of ticket riders, were 115,928,699.

When the ticket plan went into effect on Aug. 26, 1929, the first twelve rides were 90 cents and each additional ride in any week 5 cents. After eighteen weeks trial, the cost of tickets was raised to $1 with extra rides at 5 cents. During the year 27,000,000 5-cent rides were taken by ticket holders, or an average of 3.52 rides per ticket sold. The progress of the plan through the years has been recorded in the JOURNAL from time to time.

Supreme Court Refuses Kansas City Fare Stay

Chief Justice Hughes at Washington, D. C., on Sept. 20 refused to issue an order restraining the Kansas City Public Service Company from putting into effect an increase from 8 to 10 cents in fares. Final determination of the case awaits an appeal now pending before the court. The Kansas City Public Service Company succeeded in having a higher schedule of rates approved by the Public Service Commission of Missouri. The city took the case to a Circuit Court, which issued a temporary restraining order. The company appealed to the Supreme Court of Missouri, which held that the Circuit Court had no jurisdiction. The case was appealed, but in the meantime the city, through Marty K. Brown, Jr., sought the stay.

Digitized by Google

LATE NEWS

(Continued from Page 655)

Toledo, Ohio—The Community Traction Company has rerouted its Maumee Valley line, an interurban coach loop, so that it will abandon the Miami Street feeder line on the east side and transfer part of the operation of the Beverly feeder line to take in a new territory in Heather Downs district.

✦

Philadelphia, Pa. — Business men of South Philadelphia have now informed William S. Vare that unless the City Council appropriates funds to extend the Broad Street subway to navy yard they will take part in a "rebellion" against the Republican organization. Mr. Vare assures them that the project has his personal approval.

✦

Birmingham, Ala. — By agreement with the city, the Birmingham Electric Company will substitute buses for its street railway line from Woodlawn to Irondale. The city agreed to the change in order to obtain the electric company's right-of-way for a paved highway. Transfers will be issued on the bus line without charge. The Birmingham Electric operates only one other bus line, the Avenue F line.

✦

Louisville, Ky.—The Louisville Railway is arranging to operate more one-man cars. The Preston, Main and Eighteenth Street line, and the Portland and Shelby Street line, using double-truck two-man cars, were to go to single operator methods, the former on Sept. 18, and the latter on Oct. 5. In addition, one-man cars were to be placed in operation after 6:30 each evening on the Bardstown Road, the Second Street and the Market Street lines.

✦

New York, N. Y.—It is not regarded as likely that any statement on the Interborough Rapid Transit Company's policy on unification will be issued until after the organization meeting of the new board of directors, Sept. 30.

✦

St. Louis, Mo. — The taxable valuations of Missouri public utilities have been increased $10,905,453 by the State Tax Commission. The new total is $504,613,191 compared with $493,770,738 fixed by the State Board of Equalization in 1929. Street and electric railways are valued at $62,756,086, compared with $61,802,001. The utilities may appear before the board between Sept. 17 and 26 to protect their valuations.

✦

Richmond, Va. — The Virginia State Corporation Commission has taken under advisement the complaint of citizens of Petersburg and Hopewell that additional bus service should be rendered by the Southside Transportation Company. The Petersburg, Hopewell & City Point Electric Railway is opposing the proposal to extend the bus service.

✦

New York, N. Y.—Thomas I. Parkinson has been renominated by directors of Manhattan Railway to succeed himself on the board of directors of the Interborough Rapid Transit Company for a term of three years, as a representative of the Manhattan Railway.

Wheeling, W. Va.—Trainmen of the Wheeling Traction Company have defeated a proposal of a six-day working week, three to one. The plan was set forth simultaneously with the announcement of a schedule change by the railway which cut one run from the Martins Ferry-Rayland division and sheared one from the Barton division after 6:45 p.m. Trainmen are now working eight days and resting the ninth.

✦

Seattle, Wash.—No further transfers to the Seattle & Rainier Valley Railway line will be issued Sundays to children who ride the cars and buses of the Municipal Railway on school tokens. Sunday school cards and fares will be accepted as usual, however. The Sunday transfer privileges for all children of school age were arranged between the two systems for the duration of the school vacation period only.

✦

Memphis, Tenn.—The Memphis Street Railway has offered to Mayor Overton and the City Commission a bus line from Poplar and Cooper, out Poplar to Highland Street, down Highland to Central, in Central, past the new Fairview High School, to East Parkway, down the Parkway to Young Avenue, on Young to Cooper, and north to the starting point. Buses would run both ways all day, with extra buses during school hours. Fare would be 10 cents, with a transfer to any of the five street car lines free, and 3 cents when transferring from a street car to a bus. The company did not ask for a franchise but for an opportunity to try out the new service.

✦

New York, N. Y.—The Interborough Rapid Transit Company has served notice on the Transit Commission that it will ask the Supreme Court to set aside an order issued on Sept. 4 requiring the company to show cause why a mandamus order should not be issued compelling it to obey the Transit Commission's demand that it purchase 289 new cars and extend station platforms at Spring and Canal Streets on east side line.

✦

Baltimore, Md. — Smoking is being permitted on the new cars of the United Railways & Electric Company. And a cigar maker has replied to this concession by advertising that the particular kind of rope sold previously by him at 10 cents has been reduced to 5 cents for each length. Which has reminded one commentator of Shakespeare's immortal words: "Ingratitude, thou marble-hearted friend."

You Will Want to Tune In

ON Wednesday evening, Oct. 1, Old Counselor, speaking for Halsey, Stuart & Company, will broadcast a talk on the electric railways, over the National Broadcasting chain of 37 stations.

Philadelphia, Pa.—Probably the largest suburban station in the United States for electrified train operation will be opened here on Sept. 28 by the Pennsylvania Railroad. It will be located under the city's new Broad Street Station Building at Sixteenth Street and Pennsylvania Boulevard. The new station will accommodate all of the railroad's suburban service operating in and out of Philadelphia, involving a total of 325 electric trains daily. These trains now use Broad Street Station. Approximately 30,000 Philadelphia commuters will use the new facilities daily.

✦

Oklahoma City, Okla.—Rejection of the Oklahoma Railway's unofficial offer to remove its belt line embankment from Northwest Park if the city would pay for the work has been ordered by the city park board, members of which said they believed the Council had no right to grant a right-of-way on property dedicated for park purposes without the board's consent.

✦

Vancouver, B. C.—Despite fewer passengers carried by the British Columbia Electric Railway for the year ended June 30, the total revenue from the passenger transportation system shows a slight increase over that of last year. The greatest decrease is shown in the freight business of the company. Much of the revenue from this branch results from the interchange with various transcontinental systems, and the drop shown in freight traffic of these systems is reflected in B. C. Electric returns. Depression in the lumber industry also contributed to the decline.

✦

Columbus, Ohio—The Columbus Railway, Power & Light Company has asked the Public Utilities Commission for permission to abandon its lines to Minerva Park. A hearing is set for Oct. 28. The commission authorized the company to discontinue service on the line from Minerva Park to Westerville in December. The petition states that for fifteen years the company has suffered large annual deficits as the result of the service. The company is willing to start bus service to Minerva Park from the north corporation line on Cleveland Avenue.

✦

Philadelphia, Pa.—Dr. A. A. Mitten, president of Mitten Management, has contributed to the September issue of *Executives Service Bulletin*, published by the Metropolitan Life Insurance Company, an article in which he describes the background of his organization's recent comprehensive survey of Philadelphia traffic conditions and the measures which were recommended for their relief.

✦

Newark, N. J.—A radio receiving set and a refrigerator are features of the equipment of a new, luxuriously appointed motor coach completed in the Newark shops of Public Service Coordinated Transport for use in its special and chartered bus service. The new coach has the same chassis and the same modern body design as the company's new super-service type buses, but it is equipped with swivel chairs, upholstered in richly colored velour. A special glass-inclosed compartment has also been built around the operator's seat to insure greater privacy for the passengers.

(Late News Continued on Page 660)

Digitized by Google

Montreal Tramway to Help Defray Tunnel Cost

The Montreal Tramways, Montreal Que., has agree to pay one-third of the cost of the proposed $2,500,000 tunnel beneath Lachine Canal at Wellington Street. The city will approach the federal government immediately to obtain government assistance in the cost of construction. It is hoped that a referendum may be submitted before the end of November.

The Wellington Street tunnel would replace the bridge which now carries street railway lines and vehicular traffic over the canal. Traffic is particularly heavy at this point, and the tunnel would provide direct and easy access to Verdun and other sections of the city across the Lachine Canal.

At the meeting of the city representatives, the Montreal Tramways Commission and the Montreal Tramways, a similar tunnel to cross the canal in Cote St. Paul was also considered favorably, but the project will not be pressed for the present.

New Rates in Washington Benefit Railways

A. G. Neal, comptroller of the Washington Railway & Electric Company, says the operating report of the company for July has been misconstrued. According to the figures actually reported to the Public Utilities Commission, a decrease of 78 per cent in income is shown for July, 1930, over July, 1929. Mr. Neal explained, however, that a difference in crediting a rental item would make the decrease only 30 per cent over July of last year.

Utility experts who have examined the July operating report of the Capital Traction Company have expressed the opinion that, as in the case of the Washington Railway & Electric Company, bookkeeping methods make the decline in income over July, 1929, seem more than is actually the case. The net income of the Capital Traction Company for July is about 50 per cent below the corresponding month last year, it is stated, instead of 78 per cent as indicated by the figures.

Despite the losses in income which have resulted mainly from unrestricted taxicab completition, the inreased rates in Washington have benefited the railways. It is estimated that the companies are taking in approximately $1,000 more a day than they would have received had the old rates prevailed. From reports filed at the commission, it is shown that the 35-cent flat fare cabs are losing money. The announced intention of the commission to regulate cabs is expected to have a salutary effect in reducing the number of these vehicles.

Novel Merchandising Plan Conducted in Cincinnati

"SAVE half enough to buy your evening theater tickets by riding street cars. This is R.K.O. month." With this text, an interesting co-operative advertising plan was developed in Cincinnati during August by six Radio-Keith-Orpheum theaters and the Cincinnati Street Railway. The plan was developed through a desire on the part of the amusement people to advance the normal opening of the theater season from Sept. 1 to Aug. 1, and on the part of the railway to promote greater use of street cars in the evening.

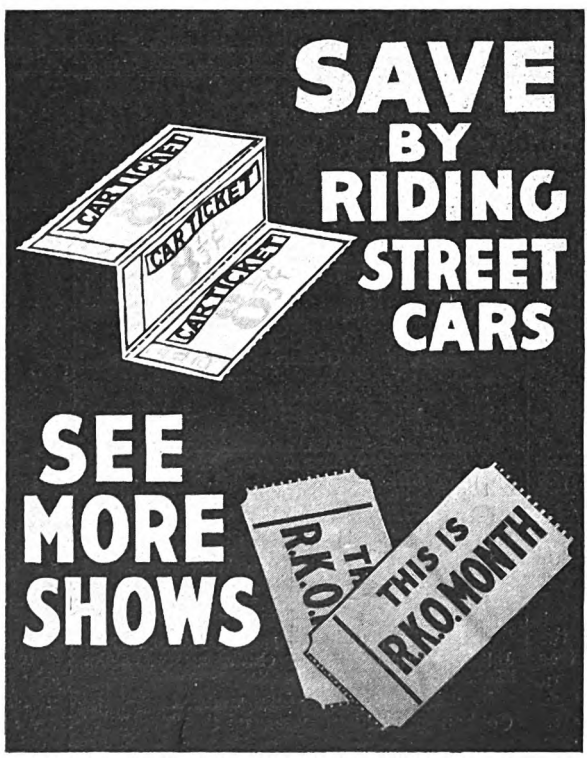
Bills of exceptional merit were arranged at all the R.K.O. theaters. Large three-color posters, 22x28 in., were carried on all street cars, featuring the theaters and the railway service. These posters showed a strip of car tickets in one corner and a bunch of theater tickets in the opposite lower corner. The poster read, "Save by riding street cars—see more shows." Posters inside the cars carried usual street car messages. These included a special corner postscript advertisement, emphasized in red, calling further attention to the use of street cars for attending evening theaters. The back of the Sunday pass for Aug. 17 was also used for the plan.

The price of admission for evening shows ranges from 30 cents to 50 cents. With the usual charge for parking of 30 cents to 50 cents and the cost of driving a car, it was shown to be possible to save at least the cost of one ticket by using the street car.

In return for the advertising carried on the street cars, the R.K.O. Corporation carried in all of its houses a two-minute news reel, featuring the advantages of street car service for attending the theater. The street car film opened with the announcement, "Cincinnati's street cars spring a new one, observing R.K.O. month," and then showed familiar street scenes with the company's street cars in service. Other captions in the film were: "There are 350,000 car riders daily," "Shoppers leave early for return to evening shows," and "R.K.O. theaters are conveniently located near car lines."

The six R.K.O. theaters give eight shows daily with an estimated attendance of 2,000 persons each performance. This means that the film was favorably presented 336 times during the week before an estimated audience of 672,000 people. Details of the plan were developed by William E. Danziger, of the R.K.O. Corporation, Hudson Biery, director of public relations of the Cincinnati Street Railway, and Clarence E. Runey, motion picture producer.

The news film showed many points of interest in Cincinnati and featured the operation of street cars. In addition three-color posters, 22x28 in., were carried on the dash of the street cars during the campaign



Digitized by Google

Bondholders Oppose Receiver's Certificates to Meet Expenses

Proposals by Elmer W. Stout, receiver of the Terre Haute, Indianapolis & Eastern Traction Company and three leased lines, to give operating expenses preference over mortgage bond obligations were opposed on Sept. 15 by attorneys for the bondholders at a hearing before Judge Joseph M. Milner of the State Superior Court in Indianapolis.

The three lines involved are the Indianapolis & Martinsville Rapid Transit Company, the Indianapolis & Northwestern Traction Company and the Indianapolis, Crawfordsville & Danville Electric Railway, having an aggregate trackage of 164 miles.

The bondholders' attorneys announced opposition to any course which would tend to reduce the equities of the bondholders in the properties, declaring bondholders agreed with the suggestion of the Midland United Company, which recently offered to purchase the bonds of the T.H.I.&E., that operation of the leased lines should be discontinued at once.

On Aug. 20, the Midland United Company, an Insull holding company, made a subsequent offer to the bondholders' committees of the three leased companies, agreeing to purchase the first mortgage bonds at about 20 per cent of face value, or a price equivalent to the salvage value of the lines plus the value of the power business conducted by them. The bonds have been selling on the open market for from 10 to 15 cents on the dollar.

On Sept. 5, Mr. Stout, the receiver for the T.H.I.&E., filed a report with the court, announcing his decision not to continue operation of the three leased lines as part of the T.H.I.&E. receivership, because of deficits in operation. Two days later, Mr. Stout was appointed receiver for each of the three companies.

On Sept. 13, the receiver asked the court for permission to borrow money from the receivership fund of the T.H.I.&E. which would become a prior lien to first mortgage obligations in order to pay deficits and continue operation of the three separate lines. This served to force the issue of whether it would be to their bondholders' advantage to continue the lines with money obtained from warrants superior to their first mortgage rights. Mr. Stout knew of no way to finance the operation other than through receiver's certificates.

Judge Milner has taken the petition under advisement.

Omaha to Vote on Bridge Bond Issue

At the November election to be held in Omaha, Neb., the citizens will vote on the question of issuing bonds for erecting a free bridge between Omaha and Council Bluffs, Iowa, to take the place of the present toll bridge owned and operated by the Omaha & Council Bluffs Street Railway.

If the decision is favorable for the free bridge, it will be a virtual repudiation of the gift by the railway of its bridge under an escrow agreement whereby the two cities are to receive the bridge free as soon as the company's price of $4,155,296 is received in tolls. The estimated time for realizing this price is 6½ years from date of the gift, Oct. 31, 1929. This time has now been cut to 5 years and 9 months.

Under the escrow agreement, the title to the bridge is being held by six Omaha and Council Bluffs men and cannot be revoked by the railway. However, the agreement provides that it will automatically be revoked if construction of a new bridge is begun within a mile of the present structure (the only logical place for a new bridge), or if condemnation proceedings are started against the present bridge.

The free bridge advocates consider the company's price of $4,155,296 for the bridge too high.

Improvement Bonds for Chicago "L" Approved

The Chicago Rapid Transit Company has been authorized by the Illinois Commerce Commission to issue $7,160,000 in two-year gold notes to provide funds for improvements. The notes are to be sold for not less than 96 per cent of par and are to bear interest not in excess of 6 per cent. They may be retired before maturity on 30 days' notice. The present plan is to refund this indebtedness when the surface and the elevated lines are consolidated. In the plea to the commission to issue the notes, the company made it plain that approval of the issue would enable improvements to be started at once, made necessary by the new franchise settlement ordinance.

Well-Rounded Program for Miami Mid-West Meeting

An elaborate program of papers and an inclusive carnival of entertainment for both the delegates and the ladies have been arranged for the annual meeting of the Midwest Electric Railway Association at Miami, Okla., on Oct. 9, 10 and 11. The program of papers follows:

OCT. 9

10 a.m.—"Welcome to Miami"—Rev. Willmore Kendall, introduced by W. L. Rush, Mayor of Miami.

Response — President H. S. Robertson, president Denver Tramway.

"The Trackless Trolley"—F. M. Peters, district manager, transportation department, General Electric Company, Chicago.

12:30 p.m.—Round table luncheon.

2:30 p.m.—"Small-City Operation"—F. J. Johnson, railway engineer St. Joseph Railway, Light, Heat & Power Company.

First aid demonstration—NEO team.

Address—J. F. Owens, vice-president and general manager Oklahoma Gas & Electric Company.

6:30 p.m.—Banquet, Rockdale Country Club.

Address—W. L. Crittenden, chairman speakers bureau Oklahoma Utilities Association.

OCT. 10

9:30 a.m. — "Electric Transportation Equipment for Present Day Operating Requirements"—S. B. Cooper, manager, general engineering department, Westinghouse Company, East Pittsburgh, Pa.

"Manufacturers' Hour" — Five-minute talks by supply representatives on developments, or on any other matter of interest.

12:30 p.m.—Round table luncheon.

2:30 p.m.—Joint session with Mid-West Claims Association.

"Solicited Claims"—G. T. Hellmuth, general claims attorney Chicago, North Shore & Milwaukee Railroad.

Address, "This Road Is Not Foolproof"—John E. Curtis, former chairman Nebraska State Railway Commission.

For hotel reservations write to H. B. Cobban, general manager of the Northeast Oklahoma Railway, Miami, Okla.

Consideration of Service-at-Cost Grant Postponed

Portland's service-at-cost franchise as proposed by the city's consulting engineers, Carey & Harlan, has been tabled and no part of the several ramifications of it requiring acquiescence of the voters of the Oregon city will appear on the ballot at the November election. This was the decision of the City Council after a second hearing on the proposed franchise on Sept. 16.

Reasons advanced by the Council for not attempting to whip the ordinance into shape at this time so as to be able to place it before the people in November were: (1) that there is insufficient time between now and election to inform the people fully as to the proposed provisions; (2) that if the proposition should be placed on the November ballot it would become a football of political controversy with the effect of obscuring the economic issues involved.

Counter proposals offered were, first, that the city offer the company $1 for tracks and pavements instead of $3,900,000 suggested in the Carey & Harlan plan, and second, that a straight 5-cent carfare be placed in effect with the city reimbursing the company out of taxes for such losses as would inevitably occur.

The next hearing on the ordinance is scheduled for Nov. 15. In the meantime it is expected that a settlement of present difficulties may be effected at informal conferences between the city's engineers and officers of the company so that the final franchise presented to the people for approval will be one that the company can accept. It is possible that the franchise may be presented before the people at some special election next year.

Baltimore Revenue Off 8.12 Per Cent in August

Revenue passengers of the United Railways & Electric Company of Baltimore declined 17.39 per cent as compared with August, 1929, according to Lucius S. Storrs, president. This is in proportion very close to the decline for this August of all the railroads in the eastern territory, so that it may be said to reflect pretty accurately the depressed business conditions and unemployment in the section.

The United's decline in gross receipts was considerably less than that of other companies, Mr. Storrs said, being only 8.12 per cent as compared with August of last year. This was due to the fare increase granted early in the year. The decline in revenue passengers this August was not due alone to depressed business conditions, but reflected also the effects of the extremely hot weather.

The final showing of the company under all circumstances is good, the president declared. The net income declined only $15,291.64 as compared with August, 1929, reflecting economies along all lines which the management was able to put into effect without interfering with the service, with decline in car-miles of only 5.29 per cent. Condensed operating figures are given in the monthly statistics on page 643 of this issue.

It is pointed out that the net result is that the United shows a smaller decrease in earnings than any railway in the country serving a comparable population where an increase of fare has not taken place.

Digitized by Google

What's in "News of the Industry"

Terms of city purchase of Philadelphia Rapid Transit actively discussed.

Luxuriously fitted bus for chartered service in New Jersey.

No hope for revamping service-at-cost now in Toledo.

Illinois Terminal installs single bedroom sleeping cars.

Gas-electrics, new cars and merchandising considered at Maryland meeting.

Fitting memorial to memory of George Westinghouse.

Economic week mad with alarms.

Third Avenue cuts its adjustment income payment.

Five-cent fare vote in San Francisco.

Maine hitch-hiking law effective.

Brill sales hold up well.

Details of New Haven's new electric locomotives.

Copper prices lowest in 30 years.

Piedmont extension case again before court.

Taxi regulation still agitates Seattle.

Good will broadcast at San Antonio effective.

More bus routes for Memphis.

Comprehensive study of parking problem in Washington with concrete suggestions for relief.

Large suburban station to be opened in Philadelphia.

Tunnel expenditure approved for Montreal.

Jacksonville still at work on new franchise.

More one-man lines for Louisville.

President Storrs explains Baltimore August figures.

Effective merchandising stunt in Cincinnati.

Electric railways subject of broadcast Oct. 1.

Ticket plan in St. Louis on trial one year.

Portland plan to be considered later.

Many attractive papers on Mid-West program.

Washington companies benefit by new rate.

Smoking permitted on Baltimore's new cars.

Parking and Garage Problem Studied at Washington, D. C.

Believing that the automobile terminal problem challenges the best constructive efforts of those who are responsible for community development; that it can be solved economically and effectively only on the basis of adequate facts, and that henceforth building and city planning must take cognizance of the implications of the parking and garage problem if serious consequences are to be avoided, the Automobile Parking Committee at Washington, D. C., has completed an extensive engineering survey on this subject, and submitted a detailed report of its findings, together with definite conclusions and recommendations.

The technical work for this committee was conducted by the staff of the National Capital Park and Planning Commission, under the supervision of Charles W. Eliot, 2d, director of planning for the commission. Dr. Miller McClintock, director of the Albert Russell Erskine Bureau of Harvard University, consultant to the commission, organized the survey, analyzed materials, and drafted the formal conclusions and recommendations.

Facts about the central business district developed by the survey revealed that future development of governmental areas, and a more intensive use of commercial land areas within the central district will greatly increase the automobile terminal problem. An analysis indicated that the demand for parking exceeds the effective supply of such facilities, and that additional provision must be made if this form of transportation is to develop. The relation of parking to business and to the transportation of government employees was carefully analyzed. It was definitely determined that parking regulations should be based on business needs, with as great liberality as is consistent with necessary freedom of movement and equitable provision of available facilities.

A summary of the general recommendations submitted by the committee follows:

Angle parking should be eliminated, as the 25 per cent reduction in capacity on the few streets where it is now permitted will be more than compensated for by greater regularity of parking and traffic movement.

The provision permitting double parking should be repealed, and a strict prohibition substituted. Loading zones should be freely established with a special provision that they may be occupied by waiting private cars in charge of a driver, when the zone is not required for loading or unloading.

One-hour parking limits should be continued in the congested districts as defined in the official regulations. One-hour limits should also be applied to any business district in the city.

A two-hour parking limit should be applied in the district immediately surrounding the present congested districts.

Within a period of two years all-night parking at any place in the city should be prohibited.

To reduce the number of all-day parkers it is recommended that parking be prohibited between 8 and 9:30 a.m. in the more congested part of the business area.

The final conclusions arrived at as a result of this survey are as follows:

It is safe to say that the eventual solution of the parking problem is not to be found along the streets, and, indeed, present conditions are such as to warrant immediate attention to alternative and more efficient terminal facilities.

While parking restrictions or prohibitions beyond those reasonably required for current use should not be used to force abnormal garage construction, a definite indication of the willingness to apply reasonable restrictions and a recognition of the ultimate need to prohibit when traffic requirements justify, should have a very stimulating effect upon private garage enterprises.

Provision of garage facilities through the self-contained block plan should in no manner discourage individual property owners from the construction of commercial garages, or the builders of office or other buildings from evolving plans to incorporate garage facilities as an integral part of their structures.

No structure should be built in downtown Washington without adequate provision for the off-street handling of commercial movement.

Garage facilities should be provided for storage space of approximately 1,000 cars in each of five buildings composing the triangle group of Federal buildings.

If the proposed garage construction is undertaken, rates should be adequate to cover operating charges.

The Business Outlook

A MAD week from start to finish, mad with alarms, plots and rumors, governmental and private, brought into play or used by professional bears as a final desperate resort to squeeze the last drop of profit out of the short side of financial and commodity markets. This sort of thing is usual in the last stage of deflation, when prices have discounted all possible further business decline and are beginning to respond to the forces of recovery. Such forces are obviously though still feebly at work, but the rate of improvement is too slow to warrant expectation of return to normal levels in the few remaining months of this year, without more vigorous Federal Reserve action and militant business leadership.

—*The Business Week.*

Two Ohio Lines Suspend

Two of Toledo's oldest interurbans, the Toledo, Bowling Green & Southern and the Toledo, Fostoria & Findlay will cease operation on Oct. 1 under authority granted by the Ohio Public Utilities Commission. On application of the Cleveland Trust Company, trustee, C. C. Fernsell, Dover, has been named receiver for the Toledo, Fostoria & Findlay line. Service on this road was stopped for a day when the Lake Erie Power Company, supplying energy for a section of the line shut off the power because of an unpaid bill of $5,000. Representatives of the Western Ohio Railway & Power Company, said the abandonment of the T.F.&F. line would force the Western Ohio lines out of business. The latter connects Piqua, Lima and Findlay.

Digitized by Google

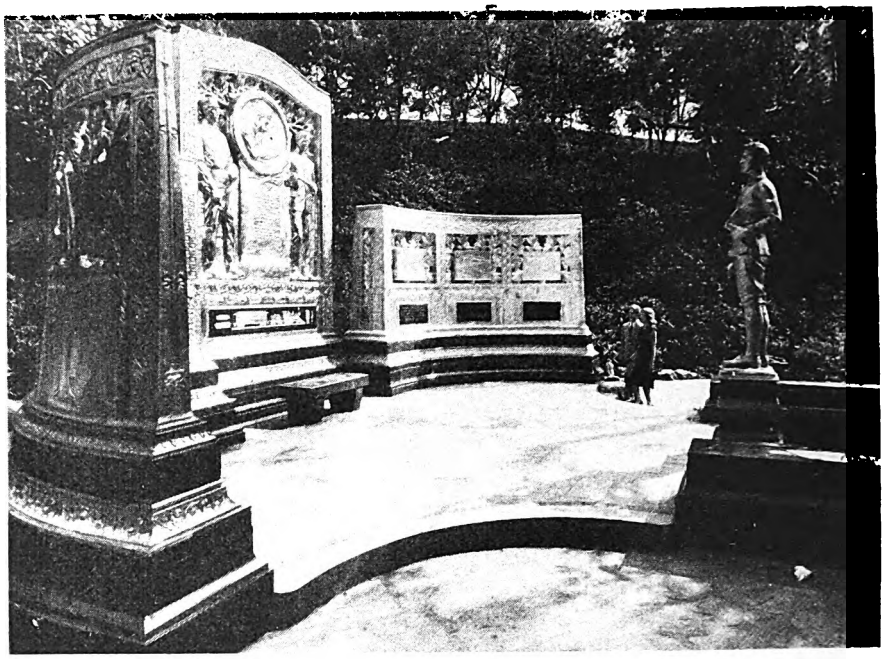
Memorial to Be Dedicated Oct. 6 to Westinghouse

Dedication of the memorial to George Westinghouse, inventor and founder of the vast industries which bear his name, will take place on Oct. 6. Invitations are now being sent to leaders of industry, science, art and education to attend the dedication as guests of honor and pay tribute to the genius who conceived the air brake, developed the steam turbine and was the proponent of alternating current, and, as well, created industrial structures to provide the world with the benefits of these vital engineering developments.

The ceremony will include the dedication and unveiling of a bronze group of heroic proportions created by Daniel Chester French, America's foremost sculptor. A banquet will be tendered to the invited guests in the evening.

The construction of the memorial and its dedication is in charge of a board of trustees consisting of the men who captain the Westinghouse industries. Erection of the memorial was made possible by appropriation and subscriptions among 60,000 employees of Westinghouse industries in the United States and other countries. Its location will be the most beautiful spot of Schenley Park, Pittsburgh.

Mr. French created the center unit of the memorial and the companion piece—the American youth. Henry Hornbostel designed the setting for the memorial. The Piccarelli brothers constructed the models of the various units for casting. Paul Fjeldi designed the six panels depicting the great achievements of Mr. Westinghouse The main unit rises 20 ft. from a Norwegian granite base. It includes a dominating figure of Mr. Westinghouse in the prime of his life. Flanking him are two figures depicting a skilled workman and an engineer typical of the thousands of artisans who assisted the master in his work. Facing this group on a separate pedestal is a figure of American youth modeled in an inspired attitude as he studies the monument of achievement.



Memorial to memory of George Westinghouse in Schenley Park

Balanced Development Needed for Rapid Transit

The planning of future rapid transit lines so as to create, in the more open areas of New York City, important new business and residential centers entirely independent of the congested midtown Manhattan sections, is urged by the Regional Plan of New York in a report made public on Sept. 27. Decentralization, brought about by transit, zoning and planning, is seen as the only means of avoiding overbuilding and the stifling of circulation in the old centers.

This report, on the relation between building bulks and transit, covers one of a series of studies being prepared by the Regional Plan staff as part of the final volume of its surveys of the metropolitan New York region, which have been under way during the past seven years.

The report points out that the construction of new transit lines to the already overcrowded centers, instead of relieving the congestion in these centers, would "add to the congestion by giving new facilities to extend and maintain it." By utilizing new lines to build up undeveloped parts of the city, however, public authorities would promote balanced development.

LATE NEWS

(*Continued from Page* 656)

New York, N. Y.—The Third Avenue Railway has declared a semi-annual interest payment of 1¼ per cent on the $22,536,000 5 per cent adjustment income bonds payable on Oct. 1. The bonds have been on a 2½ per cent annual basis since 1924. After the October payment arrearages will total 35¼ per cent.

✦

Saskatoon, Sask.—Extensive development of the railway system owned by the city is under consideration by the City Council. It is proposed to establish a shorter route to the Sutherland district, to establish railway service to University Heights subdivision over 25th Street bridge and to extend the services on Avenue L. Extension of services along Twelfth Street east to Albert Avenue and on Albert south to Eighth Street are also under consideration.

✦

New York, N. Y.—The Transit Commission engineers testify that it would cost $6,000,000 extra to build the city's proposed Sixth Avenue subway with the present elevated structure of the Manhattan Railway left standing.

✦

Nashville, Tenn. — A petition asking that the Nashville Railway & Light Company be required to furnish the Nashville Interurban Railway with the current necessary for its operation, has been filed in Part II of Chancery Court before Chancellor James B. Newman. The case involves interpretation of the terms of a contract for power entered into between the companies in 1915.

✦

San Francisco, Cal. — Voters of San Francisco will in November pass on the advisability of the continuation of the 5-cent fare for the municipal railway, it appeared after unanimous approval of the proposal by the judiciary committee of the supervisors. However, action upon the proposed amendment to the city charter to fix the rate definitely has been deferred to determine the need for a clause to utilize a tax subsidy in the event of a deficit.

✦

Portland, Me. — General James W. Hanson, chief of highway police of Maine, writing in the *United States Daily*, says that the Maine anti-hitchhiking law has been effective and is a deterrent to the very great nuisance of soliciting transportation from passing motorists. Prior to its becoming effective on July 13, 1929, the law was well advertised through the press to the people of the state. Police records do not show a single case of prosecution for violation of this act since it was passed.

✦

New York, N. Y.—Herman A. Metz, who has been asked by the Transit Commission to resign his post as a director of the Interborough Rapid Transit Company, to permit the substitution of a man "more sympathetic toward the commission's policies," stated that he submitted the request to the I.R.T. board and they told him "unanimously to stick." Mr. Metz also said that "if the city's unification plan is something I cannot conscientiously support as fair dealing, it will be time for me to resign, and I will quit then."

✦

Corning, N. Y.—Five cars formerly in service on the Elmira, Corning & Waverly Traction Company's line, discontinued some time ago, have been transferred into cottages of three rooms each by the operator of a camping ground at Lake Lamoka, where they are now in use.

Digitized by Google

Maryland Operators Discuss Many of the Latest Developments

Cruising down Chesapeake Bay, the members of the Maryland Utilities Association held an enjoyable meeting on Sept. 11-12. The steamer *City of Atlanta,* chartered by the association, provided facilities for the meetings of the transportation, electric and gas groups which were held Wednesday evening and Thursday morning.

At the evening meeting of the transportation group, the chairman, Adrian Hughes, Jr., superintendent of bus transportation United Railways & Electric Company of Baltimore, introduced J. C. Thirlwall of the General Electric Company, who told of trends in urban transportation. Mr. Thirlwall illustrated his various points by means of talking movies, in particular the development of light-weight railway motors and modern cars.

Friday morning's meeting was devoted to a general discussion of car and bus equipment for city and intercity service, under the leadership of Mr. Hughes. Mr. Thirlwall discussed the action of the magnetic brake. The effect is proportionally more on a "greasy" rail than on a clean, dry rail, he said, as there is no reduction in magnetic pull due to rail condition.

That where high rates of acceleration and braking are used it is necessary to have additional supports for passengers, such as stanchions and grab handles, was the opinion of several speakers, including A. T. Clark and D. J. Locke, of the United Railways & Electric Company, Baltimore.

Improvements in equipment demand an entirely new operating technique, according to Mr. Locke. The men must be specially trained to run the new type of vehicle successfully. Operators must understand that they have a vehicle that can be stopped as quickly as a rubber-tired one.

Mr. Hughes compared the results of modern double-deck gas-electric buses of large capacity with old types they had replaced. The new buses make a faster schedule since the design is better, and rapid automatic acceleration is possible. This change has brought new riders.

Labert St. Clair, director of advertising, American Electric Railway Association, warned against making new cars too good, since then they do not wear out, and it is difficult to make replacements before they are entirely obsolete. He also spoke briefly of the results obtained with the 2-cent fare for short-distance riders in Cleveland between the Public Square and Eighteenth Street. At present four times as many passengers are being carried as formerly with an 8-cent fare. There is no reason, believes Mr. St. Clair, why transportation cannot be sold in bulk like electric or gas service, perhaps on a credit basis. This plan preferably should be handled by means of a house-to-house canvass.

At Jamestown, Va., an hour was spent inspecting the ruins of the first English settlement in America. Another stop was made at Yorktown. There golf, bathing, and a bus trip to see historic points in that town and in Williamsburg were the attractions for the delegates. In the evening dancing and bridge were enjoyed.

Conspectus of Indexes for September, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares* 1913 = 4.84	Sept., 1930 **7.99**	Aug., 1930 **7.99**	Sept., 1929 **7.76**	Aug., 1930 **7.99**	Sept., 1925 **7.29**
Electric Railway Materials* 1913 = 100	Sept., 1930 **133.0**	Aug., 1930 **134.2**	Sept., 1929 **146.1**	Dec., 1926 **159.2**	Sept., 1930 **133.0**
Electric Railway Wages* 1913 = 100	Sept., 1930 **231.8**	Aug., 1930 **231.8**	Sept., 1929 **231.0**	Aug., 1930 **231.8**	Sept., 1925 **222.7**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	Sept., 1930 **195.6**	Aug., 1930 **196.1**	Sept., 1929 **203.4**	Nov., 1928 **205.7**	Sept., 1930 **195.6**
General Construction Cost Eng'g News-Record 1913 = 100	Sept., 1930 **199.6**	Aug., 1930 **201.0**	Sept., 1929 **207.6**	Jan., 1927 **211.5**	Sept., 1930 **199.6**
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	Aug., 1930 **84.0**	July, 1930 **84.0**	Aug., 1929 **97.7**	Nov., 1925 **104.5**	July, 1930 **84.0**
Wholesale Commodities Bradstreet 1913 = 9.21	Sept., 1930 **10.42**	Aug., 1930 **10.45**	Sept., 1929 **12.67**	Dec., 1925 **14.41**	Sept., 1930 **10.42**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	Aug., 1930 **143.7**	July, 1930 **144.0**	Aug., 1929 **160.2**	Nov., 1925 **167.1**	Aug., 1930 **143.7**
Cost of Living Nat. Ind. Conf. Bd. 1914 = 100	Aug., 1930 **151.6**	July, 1930 **152.4**	Aug., 1929 **162.9**	Nov., 1925 **171.8**	Aug., 1930 **151.6**
Industrial Activity Elec. World, kw.-hr. used 1923-25 = 100	Aug., 1930 **105.3**	July, 1930 **105.1**	Aug., 1929 **128.2**	Feb., 1929 **140.4**	Aug., 1925 **94.3**
Bank Clearings Outside N. Y. City 1926 = 100	Aug., 1930 **86.9**	July, 1930 **91.6**	Aug., 1929 **111.7**	Oct., 1929 **111.8**	Aug., 1930 **86.9**
Business Failures Number	Aug., 1930 1630	July, 1930 1930	Aug., 1929 1350	June, 1930 1874	Sept., 1928 1348
Liabilities, Millions of Dollars	**57.06**	**72.21**	**35.63**	**114.40**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Late T. E. Mitten Large P. R. T. Holder

Although published reports of inventory of the late Thomas E. Mitten's estate filed with register of wills showed holdings of only 10 shares of Philadelphia Rapid Transit stock, Dr. A. A. Mitten declares that his father's investment in Philadelphia Rapid Transit stock actually consisted of 20,000 shares. A more careful inspection of the inventory will show, he pointed out, that this stock is held by holding companies, in which his father owned all of the capital stock. Value of the total estate was $3,527,184 according to the inventory filed by the executors. The largest single investment was $1,902,261 in Mitten Management, Inc.

Purchase by City Discussed

The consensus of opinion of members of the transit conference at Philadelphia, Pa., as expressed at the meeting on Sept. 17, was that a special appraisal of the Philadelphia Rapid Transit Company and the underliers should be made, in line with the movement of the conference to bring about purchase by the city.

In discussing the proposed project, Deputy City Comptroller Wilson pointed out that the most the city could be expected to pay was from $130,000,000 to $150,000,000. He stressed the necessity of quicker action by the conference, stating that the city's borrowing capacity was at the present time insufficient to meet the need of the city for further improvement and municipal projects planned. He contended that purchase of the transportation system would increase the city's borrowing capacity by from $100,000,000 to $130,000,000.

Mitten Management pledged to the conference complete co-operation in making the proposed appraisal of P. R. T. property. Moreover, the conference was assured that earnings of P. R. T. for 1930 would be more than sufficient to meet common and preferred dividend requirements.

Louisville Curtails Its Advertising Activities

James P. Barnes, president of the Louisville Railway, Louisville, Ky., has announced the discontinuance of the publicity department of the company and the position of publicity director, held by Earl D. Hale.

Regret was expressed by Mr. Barnes at the step, made necessary, he said, by the continued loss in passenger revenue which compels the company to curtail every activity not directly relating to operation of the system. Mr. Barnes said:

"It is a matter of grave regret to the management that at the present time we are forced to stop all our advertising activities. Personally, I regard this as a backward step which we are forced to take in view of the exigencies of the situation. Mr. Hale has more than fulfilled our expectations as the publicity director of our company, and I am sorry that present conditions make it necessary for us to discontinue his department."

Digitized by Google

PERSONAL MENTION

Walter J. Cummings Made a Brill Officer

Railway Executive and Manufacturer With Wide Experience in Both Sides of Local Transportation Industry in New Affiliation With Great Potentialities

WALTER J. CUMMINGS, president of the Cummings Car & Coach Company, Chicago, Ill., was elected a director and vice-president of the J. G. Brill Company, at a meeting of the Brill board on Sept. 9. Mr. Cummings will be in charge of Brill's Western division and will make his headquarters in Chicago.

In a statement issued at that time Samuel M. Curwen, president of the Brill Company, and Mr. Cummings expressed the belief there is a distinct tendency toward an improvement in the future railway business

W. J. Cummings

and that a large quantity of new rolling stock will be purchased within the next few years.

Never has Mr. Cummings been anything less than enthusiastic about the future of local transportation. His ardent belief in that future was perhaps best expressed in an interview published in ELECTRIC RAILWAY JOURNAL for March 27, 1926. He has steadfastly held that the essential nature of the service rendered made the position of the electric railway fundamentally sound. He has, however, been fully cognizant of the possibilities of the bus and of the trolley bus. He has believed that the bus added a new valuable agency for handling a type of service that did not justify railway construction and contended that bus operation by electric railways need not be a losing venture when approached from the proper viewpoint.

As was said of Mr. Cummings in the JOURNAL for Sept. 3, 1927, at the time of his election as president of the Chicago & West Towns Railway, he knows the railway business as a manufacturer and operator, senses its needs and has confidence in its future. His active interest in the industry dates back about 25 years when the successful foundry and forging business that had been built up by the Cummings brothers was expanded through the purchase of the McGuire Manufacturing Company, well-known manufacturers of trucks and sweepers. Mr. Cummings' more recent active connection with the industry has been reflected in the rehabilitation of the Des Moines City Railway under his presidency.

Mr. Cummings was born on June 24, 1879, at Springfield, Ill. His early training was in the banking business. The Chicago & West Towns Railway, over which he assumed executive control in 1927, operates 67 miles of electric railway in the section lying just west and southwest of Chicago. In addition, it owns more than 7 miles of track which are leased to the Chicago Railways. The West Towns company also operates bus lines supplementing its railway service.

Frank T. Post Heads Spokane United Railways

Frank T. Post has been elected president of the Washington Water Power Company and affiliated companies, including the Spokane United Railways, and J. E. E. Royer has been made general manager and R. B. Childs assistant general manager.

Mr. Post succeeds the late D. L. Huntington. He has been general counsel of the Washington Water Company since 1909 and a vice-president since 1926. He is the fourth president of the company since its organization in 1889. Mr. Post has been a resident of Spokane since the spring of 1889, the year of the great fire. He began practicing law at Lowville, N. Y., 43 years ago. He is the senior member of the law firm of Post & Russell.

Mr. Royer is the seventh general manager of the company, succeeding the late Miles W. Birkett. Mr. Royer entered the employ of the company in 1907, his first work being with construction crews in connection with the maintenance of power stations and substations. He was next assigned to the light and power department and in 1919 was made assistant superintendent of that department. On Nov. 1, 1924, he was appointed assistant general manager.

Mr. Childs, the new assistant general manager, has been a commercial engineer with the company since 1923. He came to the Washington Water Power Company from the Intermountain Power Company and was with the Montana Power Company previously. Mr. Childs was a captain in the 363rd infantry regiment of the 91st division during the World War.

Charles J. McMorrow, supervisor of service for the Springfield Street Railway, Springfield, Mass., for the last ten years and for 24 years an employee of the company, has resigned to become sales manager for a real estate company in Springfield.

Advancement from the Ranks in Rochester

Three advancements in the service of the New York State Railways, Rochester lines, have been announced by John F. Uffert, general manager.

John E. Greene, formerly assistant claim agent, becomes chief claim agent under the ancillary receivership of the railways and its subsidiaries, the Coordinated, Interurban and East Avenue bus lines. He has been in the company's employ for twenty years.

Promotion of John J. Sharley from claim agent to superintendent was also announced.

A. P. Griswold becomes assistant claim agent.

H. C. Elliott Promoted by Insull Interurbans

H. C. Elliott, for many years popular at Racine, Wis., as traffic agent for the "Road of Service," has assumed his new duties as general agent of the North Shore Line, Chicago, Aurora & Elgin Railroad and the Chicago, South Shore

H. C. Elliott

& South Bend Railroad, with headquarters in Chicago.

Efficient and courteous performance of duties featured the career of Mr. Elliott since he joined the North Shore Line on June 13, 1924, as information clerk in the traffic department. In September of the same year he was transferred to the transportation department, in a similar capacity. On Nov. 1, 1924, Mr. Elliott was appointed traffic agent at Kenosha. Later he was transferred to Racine, where his geniality and painstaking efforts to serve customers made many new friends for the company, resulting in his new appointment.

H. R. Erickson, traffic agent at Kenosha, has taken over Mr. Elliott's duties at Racine.

Hugh Bradley With Commonwealth & Southern

Hugh Bradley, for some time connected with the law firm of Martin, Thompson, Turner & McWhorter, at Birmingham, Ala., has accepted a position with the secretarial department of the Commonwealth & Southern Corporation, New York.

Mr. Bradley attended the University of Alabama from 1918 to 1922 receiving his A. B. degree in 1922. Following his graduation, he entered the law school and while

Digitized by Google

studying law was an instructor in the department of political science and economics.

Before finishing his law course, Mr. Bradley was awarded a Rhodes Scholarship and took up his residence at Brasenose College at Oxford University in the Fall of 1924. While at Oxford he studied jurisprudence and received his A. B. degree in this subject in 1927.

On returning from Oxford, he was employed by the University of Alabama in extension work and conducted classes in various parts of the state in both history and economics, giving up this work with the university to join the firm of Martin, Thompson, Turner & McWhorter about Sept. 1, 1928, from which he resigned to accept his new situation.

St. Louis Superintendents in New Posts

Four veteran superintendents have been transferred to new stations by the St. Louis Public Service Company. Laurence Kearns has been changed from Kossuth to Park Avenue, George F. Trotter moving into Kossuth, M. A. Hallen has taken up his new duties at South Broadway, while W. P. January is now at Jefferson and Geyer.

Mr. Kearns began his career with the company in 1909 at the Virginia and Walsh sheds. He was made a night clerk, and later assistant foreman. In 1914 he was promoted to chief clerk to the superintedent of transportation. He served one year with the American Expeditionary Forces. Two years after his return from France, he was made relief superintendent, and in 1923 he became superintendent of the Easton station, holding that post six years. In November, 1929, he was transferred to Kossuth station.

Mr. Trotter has been with the company and its predecessors for almost 40 years. He started with the Lindell Railway in 1891 and received his first promotion in 1894.

Mr. Hanlen began as a conductor on the Lee line in 1911. He has held many station office jobs and was made superintendent for the Jefferson and Geyer station in 1925. He was in France with the American forces for eighteen months.

Mr. January also started with the company in 1911. His first work was as a conductor at South Broadway. He was made night clerk a year later and then receiver at the South Broadway station. Later he became night foreman, but in 1925 he was promoted to day foreman at Newstead Station. In 1928 he became superintendent at Park Avenue.

Frank Walsh on Interborough Board

Frank Walsh, attorney, has been nominated as director of the Interborough Rapid Transit Company, New York, by the transit commission. He succeeds William W. Niles, whose three-year term has expired.

Mr. Walsh will represent the public on the Interborough Rapid Transit board. He is understood to favor unification if satisfactory terms can be reached for the city.

The new director has been a member of the American bar, specializing in public utilities, for more than 40 years. He was a member of the commission appointed by Governor Roosevelt to study the Public Service Commission Law and was co-author of the minority report.

In 1912 he was appointed by President Wilson to head a national commission on industrial and economic relations. During the war he was a member of the Labor Conference Board.

Herman A. Metz and A. E. Blackmar are the other "public" directors.

"Clint" Spurr a Bank Director

Announcement has been made of the election of A. C. Spurr, general manager of the Wheeling Traction Company, Wheeling, W. Va., to be a director of the National Exchange Bank of Wheeling.

Election of Mr. Spurr increases the National Exchange board to a membership of eleven. He brings to that body an extensive experience as a business and public utilities executive. Although he has been located in Wheeling only a few years since assuming charge of the Wheeling Traction system, Mr. Spurr has gained a commanding place in both business and civic affairs. He is a past president of the Public Utilities Association of West Virginia, a past president of Fort Henry Chapter Reserve Officers' Association, chairman of the Activities Committee of Oglebay Park and a member of the boards of directors of the Wheeling Y. M. C. A. and the State Fair Association.

H. B. Fleming Made President of Chicago City Railway

Harvey B. Fleming has been elected to succeed the late Leonard A. Busby as president of the Chicago City Railway, the Southern Street Railway and the Calumet & South Chicago Railway, all of which are parts of the Chicago Surface Lines system. Under Mr. Busby, Mr. Fleming had been vice-president of the three companies as well as chief engineer of the Surface Lines. He began his career with the Surface Lines in 1899.

Mr. Fleming was also chosen as a member of the board of operations of the Surface Lines to succeed Mr. Busby. He was likewise made a member of the executive committee of the board of operations.

Harry P. Weber, law partner of Mr. Busby, was elected vice-president and general counsel of the three companies of which Mr. Fleming is president.

Henry C. Page Retires from Worcester Street Railway

HENRY C. PAGE has retired as general manager of the Worcester Consolidated Street Railway, Worcester, Mass., a veteran railroader, battle-tried but not battle-scarred, to take a vacation "for the rest of my life." A genial spirit and a deal of a philosopher, Mr. Page will not fret and rust because he is no longer pinned to a schedule. There are fish to catch, games to play, books to be read, friends to cultivate.

As the *Worcester Telegram* so aptly put it, Mr. Page has seen about all there has been to see in the development of urban and interurban rail transportation. He began in the ranks and brought himself up to leadership. As a conductor he rode the old cars in the days when a plodding pair of horses, with an extra horse at the hills, supplied the motor power. He was on the reception committee which welcomed electricity. He served through the boom time when trolley lines simply could not be chartered, built and operated fast enough, and when President Mellen of the New Haven was acquiring them with the lavish gestures of a Rajah buying Koh-i-noors.

Under the changed economic conditions of the last decade, Mr. Page has been a really courageous fighter. For a good many years he has been getting Worcester's residents down to their jobs in the morning and back at night safely, inexpensively and on time. He knows all about blizzards and traffic snarls and labor relations and all the other things with which a trolley line operator has to perplex himself. He has worked hard and intelligently and he has enjoyed doing it. As the *Worcester Telegram* so generously said, when you come to think it over "Worcester owes something to that kind of a man."

Mr. Page began his railway career more than 45 years ago as a conductor with the Lynn & Boston Street Railway. He was rapidly promoted with this company and finally was placed in complete charge of the schedule arrangement and car dispatching. When the Boston & Northern Street Railway was formed, Mr. Page was retained by it and was promoted from time to time until he became general superintendent in charge of 405 miles of track. In this capacity he was particularly successful in handling the employees, and in his arrangement of the schedules.

In 1903 Mr. Page become general manager of the Berkshire Street Railway, Pittsfield, Mass., and remained with that company until June, 1905, when the property passed into the hands of the New York, New Haven & Hartford Railroad. At the same time the Springfield Street Railway was also taken over by the New Haven, and Mr. Page was appointed general manager of the Springfield Company. In November, 1907, he was elected vice-president of the Springfield Street Railway and continued in this capacity until September, 1909, when he was appointed general manager of the Worcester Consolidated Street Railway and affiliated companies to succeed E. G. Connette. He has served the Worcester Company continuously since that time.

E. J. Bock Supervisor of Stations for Chicago "L"

Edward J. Bock, former trainmaster at the Highwood yards of the North Shore Line, has assumed the duties of general station inspector of the Chicago Rapid Transit Lines. Before joining the "L" lines, Mr. Bock was employed with the North Shore Line for twelve years. He entered the employ of that interurban line in October, 1918, as assistant superintendent of transportation, serving in that capacity, and as superintendent of freight until Jan. 1,

Digitized by Google

1924, when he was appointed supervisor in the transportation department. On Feb. 1, 1927, he was appointed yardmaster and on Feb. 15, 1929, was named trainmaster, being employed in that capacity until shortly before his transfer to the Rapid Transit Lines.

R. C. Forman in New Stone & Webster Post

R. C. Forman, well known for his personnel work with Stone & Webster companies, has been transferred from the Virginia Electric & Power Company, Richmond, Va., to the property of the Western Public Service Company at Scottsbluff, Neb.

Mr. Forman has taught at Louisiana State and Texas Universities, has taught in several high and normal schools in Texas, has been a traveling salesman, and was teaching salesmanship and public speaking when he joined the Stone & Webster organization in Texas some years ago.

R. C. Forman

Devoting his attention to public speaking and personnel improvement work of a general nature, he has, since his affiliation with Stone & Webster, carried on his activities on many of their properties in the Southwest and the Old South. The latest scene of his endeavors has been the various properties of the Virginia Electric & Power Company, with headquarters in Richmond.

Mr. Forman is a good "mixer," and has been very popular with the personnel of every organization with which he has been associated.

He was born in Mississippi and attended Louisiana State University, where he was graduated in 1917 with an A.B. degree. Following this he engaged in post-graduate work at the University of Nashville, the University of Texas, and the University of Chicago. While attending the latter institution he took up special work in public speaking, following this with a course at the Boston School of Expression.

F. T. Whiting Westinghouse Official at Chicago

Fred T. Whiting has been appointed assistant manager of the northwestern district of the Westinghouse company under N. G. Symonds, commercial vice-president. Mr. Whiting was graduated from Iowa State College in the class of 1913, and immediately entered the apprenticeship course of the Westinghouse Machine Company. In 1915, he joined the sales department at East Pittsburgh, but was transferred to Chicago in 1917. He served in the United States Army for two years as a major in the Fifth Engineers Corps, returning to Chicago to assume his former duties. He was manager of the engineering division of his company from June, 1920, to June, 1921, and then became industrial manager, a position he occupied until his appointment as assistant manager of the northwestern district. Mr. Whiting was born and reared in Iowa.

W. Howe Sadler with Kentucky Utilities

W. Howe Sadler, Louisville, Ky., has been named by the Kentucky Utilities Company as manager of its public information, advertising departments, to direct publicity and advertising, and kindred activities, succeeding J. Earle Davis, resigned. Mr. Sadler went to Louisville four years ago from Atlanta. He started his newspaper work with the *Daily Capital*, of Topeka. He attended the University of Arkansas and Kansas University. He holds a lieutenant's commission in the 313th Cavalry, being a member of the Reserve Officers Association. With the Kentucky Utilities Company he will come in contact with railway, bus, power, ice, water, gas and various other units under the control of this large Insull organization.

W. J. (Jerry) Stanton Sells His Cuban-American Holdings

W. J. Stanton, for more than two years vice-president and treasurer of the Cuban-American Manganese Corporation, New York, has disposed of his holdings in that organization, controlling interest of the company having been purchased by the D. M. Goodrich Company.

For a number of years Mr. Stanton was employed by the General Electric Company and the Ohio Brass Company in the engineering and commercial departments and, in this capacity, traveled to all parts of the United States building up, incidentally, an extensive acquaintance among public utility executives and operators.

Mr. Stanton has made no definite arrangements for an immediate future, but it is quite probable that he will again enter the public utilities supply field, with which he has been so long associated.

C. R. Jones Promoted

The Westinghouse Electric & Manufacturing Company announces the appointment of Charles R. Jones as assistant Northeastern transportation manager.

Mr. Jones entered the employ of the Westinghouse Company shortly after he was graduated from the University of Pennsylvania. After completing the company's apprenticeship course, he was assigned to duties in the railway department at East Pittsburgh headquarters, and specialized in electric railroad work. Since 1911, he has represented the Westinghouse Company in the railroad and electric railway fields in the New York district.

George Keller, truck service engineer of the J. G. Brill Company, resigned on Aug. 15 to engage in the garage business in Philadelphia.

R. P. Tarbell in Executive Post With Welding Engineers

Ray P. Tarbell has recently become a member of the firm of Robert E. Kinkead, Inc., consulting welding engineers, Cleveland, Ohio. He was formerly Cleveland district sales manager of the Lincoln Electric Company, manufacturers of "Stable-Arc" welders and "Linc-Weld" motors.

In his new position, Mr. Tarbell will be connected with a firm which has established a national reputation as specialists in a new division of consulting engineering work. Robert E. Kinkead, Inc., serve as welding engineering consultants for large steel companies, steel fabricators and manufacturers of mechanical equipment. They also supervise the establishment of welding departments within industrial firms and direct the methods of welding procedure and control and the redesign of products for arc welded steel construction, a field in which Mr. Tarbell in his

R. P. Tarbell

former capacity has been actively engaged for many years. As vice-president and secretary, Mr. Tarbell will aid Robert E. Kinkead, well known authority on welding procedure and control, in his executive duties as president of the firm which bears his name.

Mr. Tarbell entered the employ of the Lincoln Electric Company in 1918. He was afterward promoted to the sales force and later made district sales manager of the company. He attended Dartmouth College.

Heber LaMonte Acts for Indiana Railroad Only

In the September issue of ELECTRIC RAILWAY JOURNAL, in the article regarding the change in the personnel of Indiana Railroad as successors to Union Traction Company of Indiana, there was a paragraph to the effect that "Heber LaMonte will be superintendent of motive power of the joint properties, reporting to Mr. Bucher."

This paragraph is in error. Mr. LaMonte was superintendent of motive power of the Union Traction Company, and continues as superintendent of motive power for Indiana Railroad. The paragraph just quoted would rather indicate that he had been placed in charge of the motive power departments of the different companies of the system. This is incorrect.

Digitized by Google

OBITUARY

Frank R. Ford

Frank R. Ford, a founder and member of the consulting engineering firm of Ford, Bacon & Davis, Inc., died on Sept. 17, following an operation, at the age of 59 years. Active for 39 years in the public utility and industrial engineering field, and intimately connected with electric railway problems throughout this period, the passing of Mr. Ford is a grave loss to the entire industry. Since the work of the company of which he was the head included consultation, design, valuation, reports and management of utilities and industrial enterprises which present engineering problems, Mr. Ford was a vital force in the development of American industry. Concentrating in the earlier years on the firm's activities on the planning and construction of electric railways, Mr. Ford assisted in assembling one of the most valuable collections of electric railway statistics in this country.

Frank R. Ford

Among the outstanding achievements of Mr. Ford and his associates were the reorganization of the Metropolitan Street Railway of New York City, the electrification and unification of railway lines in New Orleans, management of the Philadelphia Company at Pittsburgh for several years, the unification of the Chicago railways in 1905, the rebuilding of the San Francisco railway system after the earthquake, and the reorganization of the Philadelphia Rapid Transit Company in 1911. Necessarily the history of his firm is largely the history of Mr. Ford.

Following the graduation of Mr. Ford from the University of Pennsylvania with the degree of B.S. in 1890, and the advance degree of M.E. in 1891, he served with several electric manufacturing concerns, among them the Short Electric Railway Company, Cleveland. In 1894 Mr. Ford and George W. Bacon formed the consulting engineering firm now known as Ford, Bacon & Davis, Inc. Mr. Davis was admitted to the partnership in 1895. Among the earliest undertakings of the company was the electrification of the railways of New Orleans, including the Orleans Railroad and the Canal & Claiborne Railroad, and the re-equipment of the New Orleans & Carrollton Railroad, Light & Power Company. Following the completion of this work the firm assisted in the unification of the individual systems. Subsequent modernization and reorganization of several other southern properties led to the formation of the American Cities Company, which controlled and managed the systems until 1917.

Another early achievement of the company under Mr. Ford was the rebuilding in 1900, following the purchase in 1898, of the rail line, extending from Edgewater, N. J., opposite New York City, to Leonia. In rebuilding this system and extending it to Hackensack many difficult engineering problems had to be solved.

Two more major activities followed shortly—the electrification and rebuilding of the cable railways of Kansas City in 1901 and the rehabilitation in the same year of the Short Line from Ardmore, Pa., to Llanerch, now known as the Philadelphia & West Chester Traction Company.

In the following year the firm was engaged to develop a unified system of all the street railways in Chicago by the city. It made a detailed study and submitted a comprehensive report which was accepted. The firm was then retained to assist in carrying through the program and putting the system into effect.

A few months before the earthquake which occurred in San Francisco in April, 1906, Ford, Bacon & Davis purchased with others the United Railways, San Francisco, the predecessor of the present Market Street Railway. Following the fire Mr. Ford participated actively in the work of rebuilding the property. The railway was managed by the company until 1926, when it was sold to Byllesby.

In 1910 the firm investigated the property and operations of the Philadelphia Rapid Transit Company for the State Utilities Commission. The recommendations prescribed standards by which the adequacy and efficiency of a railway's operations may be determined. The company was also employed by the city of Philadelphia in 1912 to investigate and report upon a proposed system of subways and elevated railroads. As a result, a report was prepared in collaboration with Transit Commissioner A. Merritt Taylor, which, it is said, was the most comprehensive study of high-speed transportation ever made. The firm was subsequently engaged for three years as consulting engineers on the construction design of the system. For the past two years the company has been making a valuation of Philadelphia Rapid Transit Company holdings.

One of the largest acquisitions of the firm, made in 1912, was that of the Philadelphia Company, owning the rail, light and gas systems in Pittsburgh. These properties were completely rehabilitated shortly after the purchase. The system was sold to Byllesby & Company later. The Lackawanna & Wyoming Valley Railroad, built in 1904 by the Westinghouse Company and other interests for testing equipment, was purchased by Ford, Bacon & Davis in 1913.

Active participation in the modernization or rebuilding of large electric railway city properties has been engaged in by the firm in Washington, Baltimore, New York, Brooklyn, St. Louis, Cleveland, Toledo, Providence, Richmond, Nashville, Duluth, Sioux City, Birmingham, Montgomery, Atlanta, Houston, Little Rock, Kansas City, Mobile, Knoxville and Memphis. Work also has been done in many smaller cities and for several interurban electric railways.

During the war the company prepared studies and maps in collaboration with the American Electric Railway Association, of the electric railway facilities along and adjacent to the Atlantic Coast, for the use of the War Department.

Mr. Ford had been an active member of the American Electric Railway Association since the formation of his company and he contributed much of his time to its advancement. In 1896 and 1897 he represented the association at the National Conference of Standard Electrical Rules, which formulated the original National Electrical Code. He was a member of the association's committee on federal relations for many years, and also served as chairman of the committee on rates and fares, a body which submitted a noteworthy report in 1911.

In July, 1917, Mr. Ford was appointed by Governor Edge of New Jersey as a member of the New York and New Jersey Port and Harbor Development Commission, a body which made a comprehensive study and plan of the port of New York. He was appointed a member of the Port of New York Authority in 1921.

Mr. Ford also was a frequent contributor to technical magazines and wrote many noteworthy articles.

Leonard A. Busby

Leonard A. Busby, president of the Chicago City Railway and one of the country's outstanding figures in electric transportation, died on Sept. 9. He had undergone an operation the previous day for a gland ailment from which he had suffered for three years. He was 61 years old. The malady from which he suffered is believed to have been aggravated by his unceasing efforts in connection with the work incident to the unification plan and the drafting and passage of the co-ordination ordinance recently approved at the polls.

Leonard A. Busby

"If ever a man was a martyr, Mr. Busby was," said Melvin A. Traylor, president of the First National Bank, of Chicago. "He should have looked after his physical well-being a year ago, but didn't take time off to do it because of the muddled state of the traction question."

Mr. Busby's death followed by two weeks the death of Frank O. Wetmore, co-chairman of the First National Bank. Mr. Wetmore was a member of a committee of bankers who are lending their aid in

Digitized by Google

the solution of the traction problem in Chicago, and in this work he was closely associated with Mr. Busby. Moreover, the two men were close personal friends.

Mr. Busby was born in Jewett, Harrison County, Ohio. He was graduated in 1894 from Ohio Wesleyan University. He later received his law degree from Northwestern University and, subsequently, for many years was engaged in the practice of law in Chicago.

In 1908 he became counsel for the Calumet & South Chicago Railway. That marked his entrance into the railway field in Chicago. Two years later he became counsel for the Chicago City Railway. In 1911 he was elected president of the Chicago City Railway, the Calumet & South Chicago Railway, and the Southern Street Railway. Following his election to these positions he gave up his law practice.

Soon after taking over his new executive duties, Mr. Busby led negotiations which resulted in affiliation of the Chicago City Railway and the Chicago Railways as the Chicago Surface Lines. He was president of this company from 1914 to 1920. He retained, in addition, his position of president of the three south side surface lines.

Mr. Busby was a member of the finance committee of the National Enameling & Stamping Company; a member of the governing committee of the Chicago City & Connecting Collateral Trust; and a director of the Chicago & Alton Railroad, National Bank of the Republic, of Chicago, and Wilson & Company, packers.

✦

F. R. Fisher

Frank R. Fisher, chief engineer of the Department of City Transit at Philadelphia, Pa., widely known as an expert on subway construction, died suddenly on Aug. 15 at the home of his brother, Frederick S. Fisher, in Lansdowne. Death was attributed to heart disease. He was 58 years old.

Soon after his graduation from Lehigh University in 1891 Mr. Fisher was appointed to the city's service in the bureau of surveys. During the Market Street subway-elevated construction he was resident engineer for the Philadelphia Rapid Transit Company. He was named chief engineer of the Transit Department in 1924.

✦

J. L. Esson

John Leonard Esson, well-known engineer and vice-president of Ford, Bacon & Davis, Inc., New York, died suddenly on Sept. 21 at the age of 52.

Mr. Esson was a native of Glasgow, Scotland. His parents settled in Chicago when Mr. Esson was a boy. There he was educated in the Chicago Manual Training School, since absorbed by the University of Chicago. His first work was in the accounting field, but 23 years ago he turned to engineering.

In his new field he became expert as a business consultant and economist, his advice being sought in many important projects in this and other countries.

✦

John H. Sheridan

John H. Sheridan, former superintendent of employment of the Los Angeles Railway, Los Angeles, Cal., is dead. Mr. Sheridan entered the employ of the Los Angeles Railway on Jan. 1, 1915, as special representative. In August, 1917, he was appointed an investigator in the claim department, which position he held up to the time of his transfer as investigator in the employment office. In this capacity he served until September, 1928, when he was appointed superintendent of employment.

As a boy, Mr. Sheridan took up telegraphy, later moving to Boston to work for the Boston & Maine Railroad. Like many other men, he heard the call of the West, and he entered the employ of the Southern Pacific Railroad. With this organization he worked his way up to chief dispatcher of the San Joaquin Division. He returned East for a short time only to return to the West as train dispatcher for the Santa Fé Railroad.

✦

Frederick Guilfoyl, superintendent of the American Brake Company's St. Louis, Mo., plant, died on Sept. 17 after an illness of eight weeks. Mr. Guilfoyl went to St. Louis from Pittsburgh, Pa., 25 years ago to become superintendent for the brake company. Prior to that he had been associated with the Westinghouse companies in the Pittsburgh district for about ten years.

Thomas F. Griffith, for the past ten years superintendent of the Lexington division of the Middlesex & Boston Street Railway, Boston, Mass., died on Sept. 9. He was born in County Galway, Ireland, on Dec. 13, 1872, but had lived in this country since a young man. He was one of the oldest employees in point of years of service of the Middlesex & Boston Street Railway, formerly the old Lexington & Boston Street Railway.

✦

Hermon Bongard, long a district and then a division superintendent of surface lines in Brooklyn, which he served for 40 years, died on Sept. 6, after a long illness. He was 60 years old.

✦

William P. Stanton, an investigator for the St. Louis Public Service Company, St. Louis, Mo., died on Sept. 14 following several weeks' illness. In his work for the company's claim department he usually answered the call docket for damage suits filed against the company in St. Louis Circuit Court.

INDUSTRY MARKET AND TRADE NEWS

Gain Over 1929 Reported by J. G. Brill

Distinct improvements over 1929 have been indicated in the business of J. G. Brill Company for this year. Sales thus far in 1930 have run consistently ahead of the same period for last year. The full year will undoubtedly show a satisfactory increase over 1929, when the company reported total sales of $6,457,630.

No new large orders have been received recently, still bookings at the present time are 10 per cent to 15 per cent higher than at this time last year. To the Gulf, Mobile & Northern Railway was shipped, in the early part of September, an unusually long and powerful motor car train, propelled by a single gas-electric power plant. Shipment was made up of a model 860 motor car and four trailers, together with an additional motor car.

Although further pick-up in business is expected to be slow, the outlook is considered favorable.

Sales of Ohio Brass Hold Up Well

Showing a continued strength in sales, the Ohio Brass Company has been able to maintain the annual extra dividend of $1 on the common stock, started last year. This reflects the small percentage of decrease in earnings the company has experienced for the year.

July and August showed some decline in the industry. Satisfactory increase for the month of September is reported by the Ohio Brass, and prospects for October and November appear even better. The expansion programs which the public utility companies are putting into action are expected to reflect favorably in the sales of Ohio Brass manufactured products.

Although the earnings so far this year have fallen from the level of 1929, when the company earned $7.78 per common share, compared with $5.24 in the previous year, it seems probable that net profit for the full 1930 year will be above the 1928 figure. The volume of export business for the year has had a substantial increase. Further increase is probable as a result of a prospective contract with the Egyptian Government and negotiations carried out with India and the Soviet Government regarding other contracts.

More Buses Are Delivered by Manufacturers

Deliveries of buses to electric railways continue to maintain a steady and normal pace at this time of the year. No unusually large order has appeared; many have been for one or two units. An interesting delivery was that of seven trolley buses by the Twin Coach Corporation to the Chicago Surface Lines to add to its present fleet of 55. Twin Coach also made deliveries of two large-capacity urban buses to the United Electric Railways, Providence; three of this type to Aronimink Transportation Company, Upper Darby, Pa.; and of the small-capacity type, the Eastern Texas Electric Company received three, and the Cincinnati Street Railway, two.

From the General Motors Truck Corporation, the Connecticut Company, New Haven, received eight Type Z, 38-passenger city service coaches; Potomac Edison Company, Cumberland, Md., seven Type U, 21-passenger city service coaches; Illinois Power & Light Company, Champaign, three Type Z, 29-passenger city service coaches; Mississippi Valley Electric Company, Iowa City, three Type U, 21-passenger city service coaches; Eastern Texas Electric Company, Beaumont, two Type U, 25-passenger city service coaches; and the North Carolina Public Service, Greensborough, one Type W, 23-passenger city service coach.

Boston Elevated Railway accepted deliv-

Digitized by Google

ery of ten A. C. F. 40-passenger, all-steel metropolitan coaches. Triple Cities Traction Company, Binghamton, received from the same manufacturers two 33-passenger street car coaches.

White Company made deliveries of twelve buses divided as follows: five Model 65A, to Louisiana Power & Light Company, Algiers, La.; one Model 65 and one Model 65A to Denver Tramway Corporation, Denver; two Model 54, to West Penn Electric Company, Pittsburgh; two Model 61, to Susquehanna Transit Company; one Model 54A, to the Boston, Worcester & New York Railway; one Model 65A, to the Burlington Rapid Transit Company, Burlington, Vt.; and one Model 65, to the West Short Transit Company, Annapolis, Md.

Deliveries by the Mack-International Motor Truck Corporation consisted of four Model BC equipped with 29-passenger city type bodies to the Louisville Railway, two Model BC to the Denver Tramway, and one Model BG to the Fishkill Electric Railway, Beacon, New York.

Copper Lowest in 30 Years at 10¾ Cents per Pound

Domestic price of copper was reduced during the past month by leading producers from 11 to 10¾ cents per pound, while at least one custom smelter, that had been quoting 10¾ cents, reduced its price to 10¼ cents. These new prices are the lowest in 30 years, and compare with 18 cents in effect from April, 1929 to April, 1930, when the decline began. Despite the slash, little metal was disposed of. It was reported that consumers who had placed large orders in June and July have deferred delivery.

General expectancy among speculators of a further drop has been a factor in holding back orders from consumers. Statistics of the August report disclose an increase of more than 25,000 tons in stocks of refined copper for that month. This is regarded in some quarters as presaging a further lowering in price in the effort to get sales; and it is also pointed out that large producers have known that stocks have been increasing and that, if a further cut was in mind, it would have come before this time.

American Brass Company, controlled by the Anaconda Copper Mining Company, has announced recently a ¼-cent reduction in all brass and copper products, including scrap and seamless tubes. The cut in prices was first announced by the Anaconda Wire & Cable Company, and was later met by the Chase Metal Company and Revere Copper & Brass Company.

G. E. Questions for Welding Inspectors

As an aid in the instruction of inspectors in the elementary and fundamental features of arc-welding as applied to ordinary steel building construction, a group of 35 questions with answers have been prepared by Frank P. McKibben, consulting engineer of the General Electric Company.

The co-operation of welding engineers, contractors and building commissioners was enlisted in this undertaking. A great many of the questions are of an elementary nature to enable men who have not had much experience with welding to ground themselves in the fundamental principles.

Orders Placed for Supervisory Control Equipment

Steadily increasing trend to supervisory control for centralized remote control of electrical power apparatus is reflected by two large orders recently received by the Westinghouse Electric & Manufacturing Company for Visicode type supervisory control equipment. These orders cover a total of 25 Visicode equipments, five having been purchased by the Long Island Railroad and twenty by the Reading Company. In addition, these orders include the switchboards for the main stations involved.

The Reading Company order covers equipment for the initial railway electrification of their Philadelphia suburban area. Seven power substations and fourteen intermediate stations in this area, which will supply current to the electrified zone of the railroad, will be entirely unattended and will be operated from a central point located in the load dispatcher's office at Wayne Junction by means of the Visicode type of supervisory control. When completed, this will be one of the largest and most extensive supervisory control systems ever installed.

Supervisory control for five substations is covered by the order of the Long Island Railroad. Four of these stations will contain mercury arc rectifiers which will be controlled by means of automatic switching equipment included on this same order. This equipment will, in turn, be remotely operated by the Visicode supervisory control. The other station will contain track breakers which will also be remotely controlled by Visicode supervisory control.

Ten New Locomotives Ordered by the New Haven

Ten 3,500-hp. electric locomotives for service on the New York, New Haven & Hartford Railroad are under construction at the Erie, Pa., works of the General Electric Company. The units, which will operate with either alternating or direct current, will handle main-line passenger trains between New Haven and New York City, including operation over the 600-volt, third-rail section of the New York Central Railroad into Grand Central Terminal or over the Hell Gate route to Pennsylvania Station.

The locomotives will weigh, complete, approximately 200 tons, with 135 tons on the driving axles. Each unit will have a capacity of fifteen 80-ton cars on level tangent track at 65 m.p.h. on alternating current, and at 58 m.p.h. on direct current, with maximum speed of 70 m.p.h.

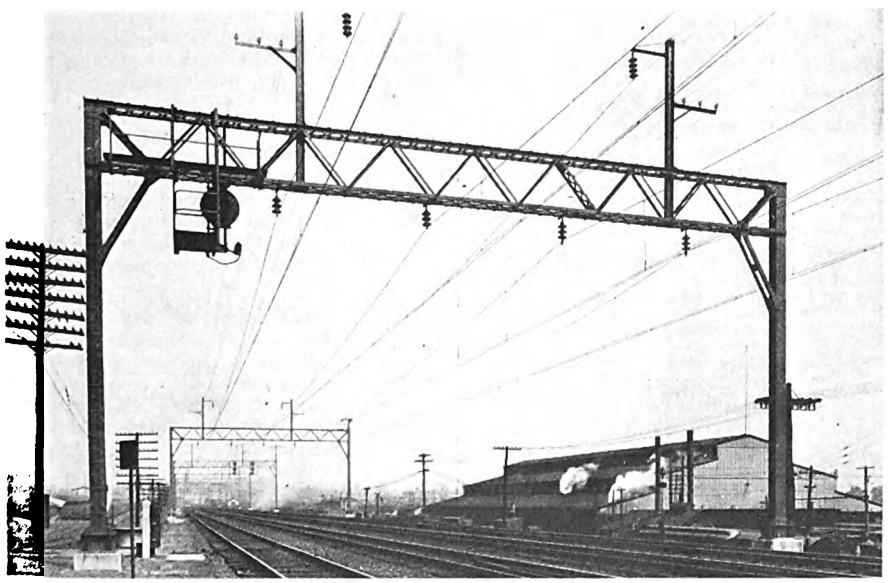
Designated as the 2-CC-2 type, they are equipped with six spring quill mounted, twin-armature, single-phase, commutator type motors designed for operation at 210 volts per armature. Each motor will have a one hour rating of about 575 hp. The two three-axle trucks are connected by an articulated joint with extensions at the outer ends supported on two-axle guiding trucks. The cab is of the box type with an apparatus compartment in the center and an operating compartment at each end. An air blast transformer is used, having reduced capacity taps on the low voltage winding for the protection of compressors and blowers. Both two-stage air compressors have a piston displacement of 100 cu.ft. per minute when operating at a pressure of 135 lb. per sq.in.

The principal dimensions (approximate) are:

Length inside knuckles	77 ft. 0 in.
Length of cab	60 ft. 0 in.
Total wheelbase	66 ft. 0 in.
Rigid wheelbase	14 ft. 0 in.

The cost of the locomotives will be $2,000,000. It is expected that they will be delivered to the railroad before the end of August, 1931.

First Section of Reading Overhead Completed



Work on the electrification of the Reading Railroad in Philadelphia and vicinity is proceeding according to schedule. This illustration shows the first completed section of the catenary and overhead construction, which extends northward from the Market Street terminal

Quigley Company offers for distribution a booklet describing the uses of Annite, a colloidal cleaning compound. This booklet may be obtained by addressing the company at 56 West 45th St., New York, N. Y.

Digitized by Google

Chrysler Announces Fargo Coaches

Chrysler Motors Corporation, of Detroit, announces the organization of a new division, to be known as Fargo Motor Corporation, which will engage in the manufacture of a line of motor coaches consisting of two series.

The Model 80 series will comprise a conventional 21-passenger coach of the street car type and a 16-passenger parlor coach. The Model 90 series will include a 21-passenger circulating load street car type coach, having a standing capacity of approximately 30 additional passengers; also a 21-25-passenger parlor type coach. The 90 series are said to include a number of original features. The product will be sold by the Fargo Motor Corporation direct to operators.

Lamme Award to Morris Stone

Second award of the Benjamin Garver Lamme Scholarship has been granted to Morris Stone, mechanical engineer of the Westinghouse Electric and Manufacturing Company. The scholarship provides one year's advanced study at any college or university in America or abroad.

This scholarship has been established in perpetuity by the Westinghouse Electric & Manufacturing Company in honor of the late B. G. Lamme, who was chief engineer of the company. Any engineer who has been in the employ of the company one year or more, and evidences unusual promise for future development, is eligible for the award.

Morris Stone was graduated from the Engineering School of Harvard in 1923, establishing scholastic records. Besides receiving the highest academic rating, Mr. Stone was also elected to the honorary engineering fraternity.

In 1925 he received his master's degree from Harvard, and in the same year joined Westinghouse. After working for three years in the research laboratory on general electricity and vibration problems, he was transferred to the power engineering department.

Mr. Stone is the author of several original treatises, specializing in problems dealing with the mechanical aspects of electrical engineering. One article in particular, "The General Torsion Problem," has secured considerable recognition in the engineering world. This paper was presented to the Third International Congress of Engineers held in Sweden in the summer of 1930. Mr. Stone has selected the Universities of Berlin and Charlottenburg at which to continue his studies.

TRADE NOTES

Robert W. Hunt Company, Engineers, announces the retirement of its president, John J. Cone, who has been a member of the company since its organization in 1888. C. B. Nolte, vice-president and general manager, has been elected president and general manager, with headquarters at the general office, Chicago. J. C. Ogden, a director and eastern manager of the company, has been elected vice-president, with headquarters at New York City.

✦

Leeds, Tozzer & Co., Inc., 75 West Street, New York, N. Y., have prepared a 16-mm. moving picture of their automatic car washing machine, with titles in English and Spanish. The film is available, upon request, for display before associations, conventions and sectional meetings.

✦

Ohio Brass Company announces the removal of its Dallas office from the former location in the Insurance Building to 1010 Allen Building, corner of Commerce and Ervay Streets.

✦

Union Metal Manufacturing Company, Canton, Ohio, announces the removal of its Eastern office from Philadelphia to 110 East 42nd Street, New York City. E. B. Comfort, eastern district sales manager, will be located in the same suite with W. A. Daunt, New York sales manager for the company.

✦

Leavitt Machine Company, Orange, Mass., has appointed Charles C. Phelps, manufacturers' agent, 11 Park Place, New York, as its sales agent for metropolitan New York and northern New Jersey to handle the Dexter valve reseating machine for globe, gate and pump valves.

✦

Lincoln Electric Company, Cleveland, Ohio, manufacturer of "Stable-Arc" welders, and "Linc-Weld" motors, announces the opening of new offices in Saginaw, Mich., Fort Wayne, Ind., and Oil City, Pa. The Saginaw office is located at 338 Barnard Street, and is in charge of J. E. Luter. The Ft. Wayne office is in charge of D. H. Carver, and is located at 225 E. Columbia Street; E. D. Anderson is in charge of the new office in Oil City, Pa.

Advertising Literature

Westinghouse Electric & Manufacturing Company offers a 60-page special publication on oil electric locomotives and rail cars. A general analysis of the characteristics and field of application of the oil electric locomotive in comparison with other motive power plants is interestingly presented. Devoted to the selection of equipment is a section giving some short-cut methods to determine the approximate application with the aid of characteristic curves.

✦

General Electric Company has published a treatment on mercury-arc rectifiers for railway use, which is designated as publication GEA-1151A. Characteristics of the mercury arc, rectifier auxiliaries and the cooling system, operating features and construction of rectifiers are covered in this publication.

✦

Sangamo Electric Company, Springfield, Ill., has published in pamphlet form a series of articles devoted to increasing the effectiveness of a load-building program. The articles are illustrated with graphs and charts describing the performance of the Sangamo meters.

✦

Fabrikoid Division of the du Pont Company has issued a booklet dealing with the style, design, color and texture of lacquered fabrics which may be used as substitutes for leather. Many illustrations are given to show how this fabric enters into the decoration scheme of many fields.

✦

General Electric Company has issued a booklet describing briefly copper brazing processes and the copper brazing furnaces which it manufactures. A recently developed process of hydrogen-copper brazing is discussed at some length with a view of presenting some of its advantageous applications.

Electric Railway Material Prices—October 1, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	10.275
Lead, cents per lb.	5.50
Nickel, cents per lb., ingot	35.00
Zinc, cents per lb.	4.25
Tin, Straits, cents per lb.	29.85
Aluminum, 98 to 99 per cent, cents per lb.	23.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	37.00
General service	31.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.15
Somerset mine run, f.o.b. mines, net ton	1.75
Pittsburgh mine run, Pittsburgh, net ton	1.40
Franklin, Ill., screenings, f.o.b. mines	1.50
Central, Ill., screenings, f.o.b. mines	1.05
Kansas screenings, Kansas City	1.50

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive ⅝ in. and larger, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.075
Angles bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	3.90
Steel bars, cents per lb.	1.63
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.35

Hardware—Pittsburgh

Wire nails, base per keg	$2.10
Sheet iron (24 gage), cents per lb.	2.40
Sheet iron, galvanized (24 gage), cents per lb.	3.05
Galvanized barbed wire, cents per lb.	2.75
Galvanized wire, ordinary, cents per lb.	2.70

Waste—New York

Waste, wool, cents per lb.	12.00 to 15.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	9.00 to 13.00
Colored	5.00 to 7.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	10.8
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	0.485
Putty, 100 lb. tins, cents per lb.	5.50

Wire—New York

Copper wire, cents per lb.	10.75
Rubber-covered wire, No. 14, per 1,000 ft.	$4.62
Weatherproof wire base, cents per lb.	13.375

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.50
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	50.00
Paving brick 3x8½x4, N. Y., per 1,000 in carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15

Old Metals—New York and Chicago

Heavy copper, cents per lb.	8.50
Light copper, cents per lb.	7.75
Heavy yellow brass, cents per lb.	5.50
Zinc, old scrap, cents per lb.	2.25
Lead, cents per lb. (heavy)	4.25
Steel car axles, Chicago, net ton	$15.25
Cast iron car wheels, Chicago, gross ton	13.75
Rails (short), Chicago, gross ton	14.25
Rails (relaying), Chicago, gross ton (65 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton	6.25

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Editor*

Volume 74 New York, November, 1930 *Number 12*

Urban Transportation Facilities Keep Pace with Population Increase

EXPANSION of organized public transportation facilities in American cities has continued steadily during the past decade, despite the enormous increase in the use of private automobiles. According to the recently completed United States census of 1930, nearly half of the inhabitants of this country live in 189 cities of more than 50,000 population and in the suburban territory immediately adjacent thereto. Today the combined rail, bus and trolley bus facilities available in these communities are approximately 20 per cent greater than those available a decade ago, while the increase in population has been about 24 per cent. From this it is evident that transportation service has kept pace with the growth of population.

In all but one of these cities of more than 50,000 population the electric railway is the backbone of the local transportation system. Even in the single city where rail service has been suspended, there is lively agitation for its restoration. To serve this immense urban territory the electric railways operate approximately 60,000 passenger cars on slightly more than 23,000 miles of track. This equipment represents 80 per cent of all the electric railway passenger cars in the country, while the track is about 60 per cent of the total electrified mileage, not counting electrified steam railroads. During the past ten years the change in total track mileage has been less than 1 per cent, abandonments in some localities having been almost exactly balanced by extensions in others. Similarly, there has been no substantial change in the number of passenger cars operated on these properties, old rolling stock having been retired to offset the new cars acquired.

TO SUPPLEMENT their rail service the electric railways operate approximately 9,000 motor buses over some 7,000 miles of route in 167 of these cities. This is slightly more than 75 per cent of the total number of buses operated by electric railways in the United States, but the route mileage is only 30 per cent of the total. There is also a small amount of urban bus operation independent of the railways, but this is not an important factor in the transportation situation except in a few cities. Practically all of the present bus route mileage has been added since 1920, there having been less than 100 miles of bus route operated by these electric railways at that date with only a few vehicles.

Recent extensions of trolley bus operation bring the present total length of route to approximately 60 miles and the number of vehicles to about 200. All of the existing trolley bus operations have been undertaken during the past decade, a few earlier installations having been abandoned prior to 1920. While the present extent of this type of operation is comparatively small, there are many indications that the next ten years will see a substantial expansion.

In about a dozen cities the electric railways operate taxicabs as well as rail and bus service. According to the latest available figures approximately 2,500 taxicabs are operated under electric railway auspices out of a total of some 65,000 in this group of 189 cities. While the desirability of co-ordinating the taxicab with other forms of public transportation has long been evident, the lack of adequate regulation has tended to deter the established transportation companies from entering this field. Recently there has been a growing tendency to classify taxicab service as a public utility. When this is done it is likely that the electric railways will expand their activities in this field.

PUBLIC transportation facilities in the smaller cities ranging from 10,000 to 50,000 in population have developed more slowly than in the large cities. The census of 1930 shows 789 cities in this smaller group. Of this number 531 have electric railway service. Among those which do not have rail service a considerable number have bus service. In many instances this is furnished by the same company which formerly operated street cars, while in others the bus operation is under independent auspices. Only about 60 cities have no organized transportation facilities of any kind.

Every reason exists to expect that public transportation facilities in cities of more than 50,000 population will continue to expand during the next ten years. A substantial expansion occurred between 1920 and 1930 despite an increase of nearly 200 per cent in the number of private automobiles. The rate of increase in private transportation facilities, however, is dropping. The fact that the ratio of automobiles to population in the large cities is only about half that in the small cities indicates that congestion is tending to discourage the use of individual vehicles. This is borne out by a recent count in one large city, which showed fewer automobiles entering the business district than were reported five years ago. On the other hand, people have a steadily increasing tendency to go from place to place. This can have only one result: a steadily growing demand for public transportation facilities.

Digitized by Google

Solving the Problem for Small-City Systems

IN SMALL cities the problem of making the public transportation service self-supporting continues to present serious difficulties. Nowhere has any simple and easy solution been found. But progress has been made in some places as a result of thorough analysis of conditions and carefully organized effort to increase riding.

Many factors affect the success of a small-city transportation property. The business and industrial situation, the provisions of the franchise, the financial structure of the company, the condition of the physical plant and equipment, the morale of the operating organization—these and numerous other things have an important influence.

Thorough understanding of local conditions is essential. This should include the opinions of the company's patrons as well as the opinions of those who do not use the service. Competition from other agencies, location of business centers, changing trends in population, industrial activity, and many other similar factors, must be taken into account.

Among the problems most deserving of study is that of financial structure. Lack of flexibility is frequently a deterrent to progress. In some instances it may be found that securities have outlived the property they represent, or the earnings are too low to justify new capital with a proper return on the old. Drastic readjustment in the financial structure may be necessary to place the system on a sound basis—to assure a fair return on the investment and to enable the attraction of new capital for improvement programs.

Analysis of operating costs will sometimes point the way to substantial savings. This will show whether headways are suited to the traffic demands, whether speed is at a maximum, and whether economies may be instituted without harmful results. Although expenses must of necessity be adjusted to the level of earnings, there is often grave danger in going too far in effecting economies. High-grade service is absolutely necessary if a railway is to build up its business, and this should not be hampered by unwise economy measures.

Another factor which demands careful consideration is the equipment. Three distinct types are now available —the street car, the trolley bus and the gasoline bus. Each has a different field of usefulness. If an analysis shows one type of vehicle to be better suited for meeting the requirements than another, the management should not hesitate to make the change as quickly as it is possible to do so. In this respect, the operator must take the attitude that he is primarily a transportation man and not simply a street car or bus operator.

Having analyzed the operating conditions in detail, the small-city manager might well concentrate on a definite program of merchandising. Fundamentally, merchandising involves three distinct steps—the production of a salable product, pricing this product so that it will appeal to the purchaser, and the actual selling. In the matter of pricing, comparatively little experimentation has been done. The old-fashioned flat fare still prevails in most cities. Undoubtedly a real opportunity exists to make improvements in this respect.

Actual selling of the service requires the whole-hearted and active co-operation of every member of the railway organization. Although the men on the cars have the best opportunity to promote business, all of the others play important parts. Market analyses; soliciting patronage by house to house campaigns; offering special inducements; notifying the public of service, equipment or fare changes; bettering the public relations at every opportunity and supplementing these efforts with skillful, well-planned advertising, are among the many steps that can be taken in an intensive merchandising campaign.

Prompt action is needed in attacking the small-city problem. Delays only add to the difficulties. Haphazard efforts in attempting to find a solution only lead to further complications. Obviously, the first step is a thorough analysis of the situation on each individual property.

Taxicabs as a Public Utility

OF PRIME importance to all local transportation interests are the recommendations presented in the comprehensive report of the Mayor's commission on taxicabs for the city of New York. Briefly, it is proposed that the business be established as a public utility under a bureau of taxicab control, that certificates of convenience and necessity be required and that taxicabs be operated under a single franchise in co-ordination with other transit agencies. Directly affecting about 20,000 cabs, a substantial proportion of the total number in the United States, these recommendations are likely to have a far-reaching influence on the entire industry.

It has long been contended that the unhealthy condition of the taxicab industry could best be cured by placing it in the category of a common carrier. This has already been done on a state-wide basis in Arizona, Connecticut, Maryland, Oklahoma, Pennsylvania and Rhode Island and in about a dozen cities in other states. That it should be done in the city of New York is the opinion of the commission.

Granting certificates of convenience and necessity will have two important results. It will limit the number of cabs in use, thereby permitting them to operate more efficiently and more profitably, and it will also raise the standards of service by imposing strict requirements on the drivers. Experience in the states and cities where this arrangement is in effect has demonstrated its advantages.

Regulation of taxicabs as a public utility and the issuance of certificates are intended, according to the New York report, to serve as stepping stones to the ultimate granting of a single franchise for the entire city. This proposal has naturally evoked protest from individual operators, small-fleet owners and interests dependent on these groups. Whether or not it would be advisable to have a complete monopoly of taxicabs in New York City is a matter of opinion. It has been found in several other cities, however, that taxicabs can be operated to the best advantage by large companies. With the pressing need for co-ordination of all transit facilities, the monopoly plan for taxicabs probably will grow in favor.

Other recommendations contained in the New York report include reduction in the number of cabs, uniform rates and service standards, uniform accounting and reporting, establishment of a city-wide plan of taxicab stands, improvement of labor conditions and establishment of qualifications for drivers. Regulation to carry out these recommendations cannot be enacted until certain legal questions have been settled. Even when this has been done, the process of changing over to a public

Digitized by Google

utility basis may be slow. It is indisputable, however, that the adoption of these recommendations would be a long step toward placing the taxicab business on a sound economic basis and would at the same time assure the public of an improved quality of service.

Compound Ignorance

NOWADAYS when some difficult problem has to be solved it is customary to begin by making a "survey" of the situation. That is generally considered to be a scientific way of securing data on which to base a decision. Sometimes it is, but very often it is not, because the method of collecting the desired information is not calculated to produce accurate results. Too many so-called "surveys" are based almost entirely upon guesswork. For example, numerous parking "surveys" have been based on estimates of merchants as to the volume of business brought to their stores by private automobiles. Their guesses, collected and tabulated, were embodied in a report. This had the appearance of containing information scientifically obtained, but was in reality little more than what has been appropriately called compound ignorance. A survey whereby facts are definitely ascertained is the best possible basis for reaching a decision on a vexing problem, but surveys based on guesswork are valueless.

$9,000,000 Choice for Indianapolis

MONTHS must elapse before the reorganization of the Indianapolis Street Railway is completed, but the preliminaries have been carried out with celerity. The receivership dates back only to April 18 of this year. Yet since then a plan has been evolved which, if it is concluded, will witness the expenditure of more than $9,000,000 over a period of five years. This is a large program. The amount of new money is a sizable sum. Aside from the technical terms of the reorganization, drastic in some respects, interest centers for the time on conditions upon which the new money is to be supplied.

Reasonable protection against any possible recurrence of the events which led up to the present receivership is what the new interests seek. They know that economic forces are at work in which all business must find its level, and they also know that in the past artificial barriers have been raised which militated against the success of the enterprise. If $9,000,000 of new money is to go in, then the company must have reasonable assurance that ability to earn on the readjusted capital shall not be denied. To this end the condition has been set down that the consummation of the plan shall depend upon the procurement of a modern service-at-cost franchise from the city indeterminate as to time. In this respect the proposal follows closely the lines on which similar settlements in Chicago and other cities have been brought about and follows the precedent established by earlier grants in Cleveland, Rochester, Toledo and other cities.

The Insulls, under whose auspices the plan is advanced, have a genius for carrying out rehabilitations of this kind, but they are not magicians. They do not produce something from nothing, although at times the results they have achieved with seemingly hopeless material have been amazing. The Legislature must act on the matter, but if the members of that body and of other bodies charged with civic responsibility are endowed with acumen, they will lose no time in seeking to fulfill their part of the obligation. The spending of $9,000,000 should make the local Indianapolis system one of the finest in the country. After what Indianapolis has endured in the past, there would seem to be only one answer to the choice of the city between the prospect of continued penury for its local transportation system as now constituted and pride at that system's prospects under the plan proposed.

Getting the Most Out of Improvements

WHEN new devices are offered by the manufacturers, emphasis usually is placed on the improvements that can be effected if full use is made of them. For instance, modern railway motors and control can start and accelerate street cars at rates as high as 3 m.p.h.p.s., and do it hour after hour and day after day. Brakes are available that can stop cars even more quickly. These rates are practically twice as great as those standard ten years ago. Other equipment has made corresponding advances in efficiency. The arguments that can be advanced in favor of the use of such modern devices make the progressive manager feel that he cannot afford to get along without it.

But when the new apparatus is bought and placed in service it does not always give anything like the results that were anticipated, and so may become a bitter disappointment. All too often the operating forces, with long training in antiquated methods, fail to grasp the real purpose of the new designs, which is not merely to replace the old with something just as good, but through the use of something much better, to make possible an entirely new plan of service. The men, not used to the new way, sometimes are afraid to see what they can do if full opportunity is taken of the improvement. Again, there is a tendency to make only partial use of it, holding the full value in reserve for an emergency. What they need is careful instruction by men who are fully competent to give it, and who are fully conversant with the possibilities of the new equipment and of its peculiarities as well. The supervisory forces must understand, for instance, that new cars cannot be placed a few at a time on routes on which there are many old cars, so that the new ones cannot show what they can do. So it is with shop tools and devices for track construction.

Sometimes this failure to see that equipment alone cannot effect the improvement is not confined to those in the ranks; it may go through the management. All in authority must be in sympathy with the purpose behind the installation, or the result will be that seen on one property when cars with full safety equipment were purchased some ten years ago on order of the state utility commission. The general manager, asked about the advantages to be obtained, stated that they were questionable, but that in a few months the special devices would be out of order anyway, and then everyone would go about his business and be satisfied. Thus it is easy to see that the cars were doomed to failure even before they were received.

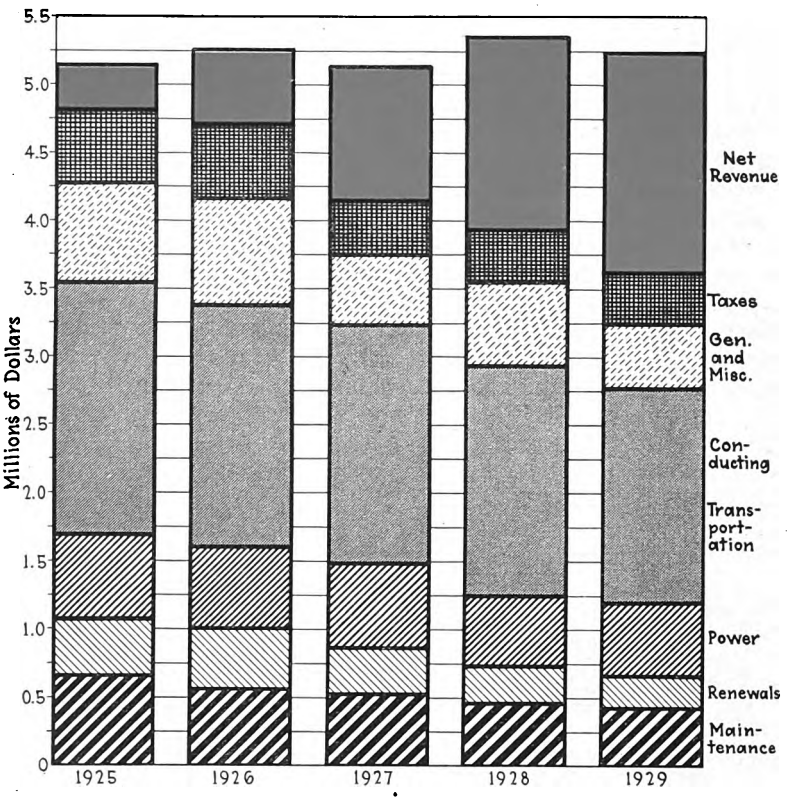
So when improvements are planned it is essential to be sure that everyone from the top to the bottom of the organization is fully "sold" on them and is willing to do his full share in getting the most out of them. Otherwise, there is little value in spending good money for changes that will largely fail of their purpose.

Digitized by Google

Good Track Layouts Facilitate Routing in Atlanta

On Marietta Street in the downtown business section of Atlanta, the railway department of the Georgia Power Company has several unusually complicated layouts of special trackwork. At the intersection of Marietta and Broad Streets is a grand union. One block to the west is a double track crossing with four connected branch-offs. This layout is further complicated by the necessity to bend the Marietta street tracks outward around a statue located in the center of the street a short distance away from the intersection.

Digitized by Google



Savings in operating expense have been made consistently in every department of the railway system. As a result, the net has gone up five times in five years

Net Revenue Increased

400 PER CENT IN FIVE YEARS

Is Atlanta's Accomplishment

Large purchases of new cars, improvements in other departments and a general gain in efficiency are features of a ten-year program of modernization that has brought great financial results

FINANCIAL benefits that will accrue from carrying through a program of modernization and adaptation of a transportation system to the needs of the times are well exemplified in the record of the railway department of the Georgia Power Company during the past ten years. Not only have improvements been made, but careful planning has been done in order to get the best results from every expenditure of effort or of money.

Back in 1921, when the present railway management took charge of the property, the system was in relatively poor physical condition, and the operating methods were not of the best, even according to the standards of that day. It was seen at once that a great deal of rehabilitation work would have to be done before it would be possible to give a type of service even approaching that which it was felt must be furnished in order to maintain the revenue at a point which would permit of profitable operation.

One of the first moves of the management was to improve the rolling stock. Accordingly, a purchase of cars was made at once, and a definite program was adopted so that further purchases of modern cars have followed consistently until, today, the average age of the cars on the property is only about seven years. As the new cars were received, the obsolete ones were retired and destroyed. At the end of 1929 there was a total of 405 cars of all types on the property. Most of the 374 active passenger cars included in this total have been bought in the last nine years. Against this, 285 cars have been retired since Jan. 1, 1923.

Soon after the decision to modernize was made, the company began laying out a definite program of improvements. The Beeler organization, of New York City, was engaged to make a detailed study of the property with a view to determining the proper routing, scheduling, and methods of operation to bring the standards up to what it was felt the public demanded. In the main, the changes

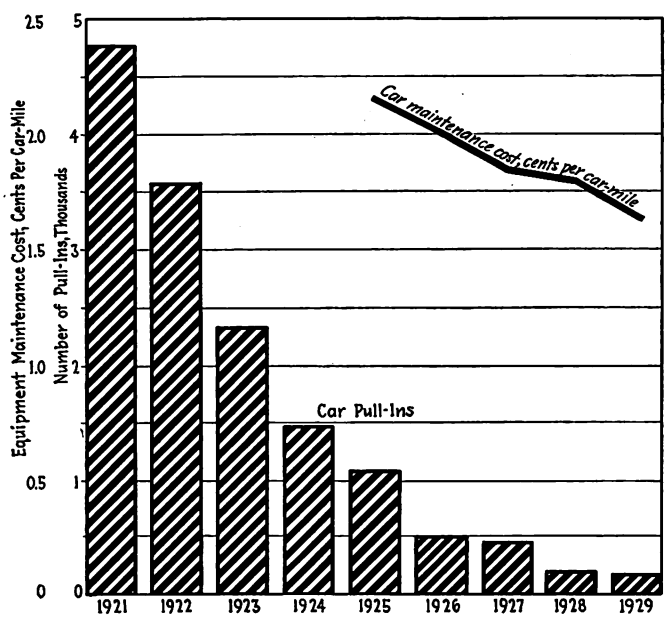
Digitized by Google

that have been made during the past several years have been based on the recommendations contained in that survey. During the entire period the operations of the railway system have been conducted under the leadership of Frank L. Butler, vice-president of the Georgia Power Company and manager of its railway department.

Naturally, the greatest interest in the results centers in the Atlanta division of the railway system. This is by far the largest unit, carrying approximately 90 per cent of the total passengers last year. Operating results for the Atlanta division are given in the accompanying table and chart. With revenues increasing slightly, it has been found possible to reduce operating expenses sharply in every department. The total operating cost last year was approximately 25 per cent less than it was in 1925. As a result, the operating income after taxes has gone up from $321,294 in 1925 to $1,607,166 in 1929, or just five times as much.

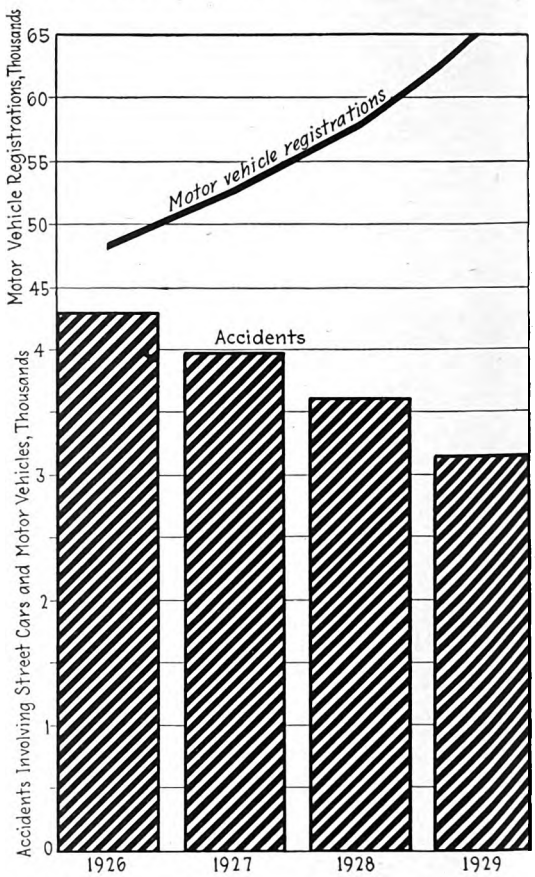
Similar comparisons for the other divisions over the five-year period are not available. The results for 1929 as compared with the previous year, however, show a general improvement, so that the net revenue for the entire railway system has gone up more than $200,000. Of this increase, $25,000 was on the divisions outside of Atlanta.

When looking for the reasons for this remarkable showing, one is struck by the great improvement in operation shown throughout. Of particular importance is the increase in reliability of the car equipment. There has been a progressive reduction in car failures over the five-year period that has brought the company up from one of the poorer ones to the leader in its territory in this respect. Last year there were only 156 car failures as against 169 in 1928. In other words, the cars were operated 83,861 miles per pull-in last year and were maintained at a cost of 1.62 cents per car-mile, as against 77,664 miles per pull-in in 1928 at a cost of 1.79 cents per car-mile. That this was not a sporadic effort was seen in the continuing reduction in maintenance cost per car-mile from 2.15 cents in 1925, and a decrease in pull-ins, the average miles per pull-in that year having been 12,226. The result is shown graphically in one of the charts.



With a remarkable record for reliability of the cars, equipment maintenance costs have been reduced sharply

In connection with the above comparison, it must be borne in mind that, while the car-miles operated have been practically the same from year to year, the motor-miles have increased from 40,424,174 in 1925 to 49,265,076 in 1929 on account of the use of a greater proportion of four-motor cars. Included in the 285 cars retired since 1922 are all of the single-truck cars as well as the older double-truck cars, many of which were equipped with two motors. Some of the cars have been rebuilt and some converted into one-man safety cars.



Accidents involving motor vehicles have gone down despite a large increase in registration in the county

New motors and control have been installed in a number of instances, but purchases of new cars were responsible for the major improvement in reliability and low maintenance cost.

In the way department construction and maintenance work were carried on at about the same rate last year as in the past several years. By careful planning it was found possible to reduce costs below the budget. Roadway payrolls have been reduced from previous years. As an example of the improved quality of workmanship, the electric switches in 1929 made a record of 102,160 operations per failure as compared with 80,271 in 1928. The unit cost of maintaining these switches, however, went down from $55.18 to $44.63, a decrease of 19.1 per cent.

In the conducting transportation account there has been a marked reduction in cost during the past five years. This has come from the gradual introduction of one-man cars, from an increase in schedule speeds, a reduction of accidents and a revision of the personnel for greater efficiency. During the past year the Pryor Street and Central Avenue viaducts were completed and opened for service. Several car lines were rerouted to take ad-

Digitized by Google

Revenues and Expenses, Atlanta Street Railway Lines of the Georgia Power Company, 1925-1929

Revenues	1925	1926	1927	1928	1929
Passenger	$5,052,378	$5,161,958	$5,034,237	$5,276,705	$5,143,871
All other	82,541	95,356	92,861	86,038	89,737
Total revenues	$5,134,919	$5,257,315	$5,127,098	$5,362,744	$5,233,680
Expenses					
Maintenance	$667,929	$569,232	$529,396	$462,995	$437,427
Renewals and replacement reserve	409,016	443,153	334,315	271,183	227,364
Power	618,590	595,088	618,710	547,034	548,052
Conducting transportation	1,837,931	1,772,888	1,750,061	1,649,817	1,563,511
Traffic	11,702	19,269	1,300	412	1,290
General and miscellaneous	730,881	763,689	518,106	628,758	473,032
Total operating	$4,276,049	$4,163,319	$3,751,888	$3,560,198	$3,250,675
Net revenue, railway operations	858,869	1,093,995	1,375,210	1,802,545	1,982,933
Taxes	537,575	541,579	403,181	370,926	375,766
Operating income	$321,294	$552,416	$972,029	$1,431,619	$1,607,167

vantage of them, saving a number of turns in the center of the city. Enough cars suitable for one-man service have been obtained so that they now are operated in the base service on all city lines but one, on which the fare situation makes their use impracticable.

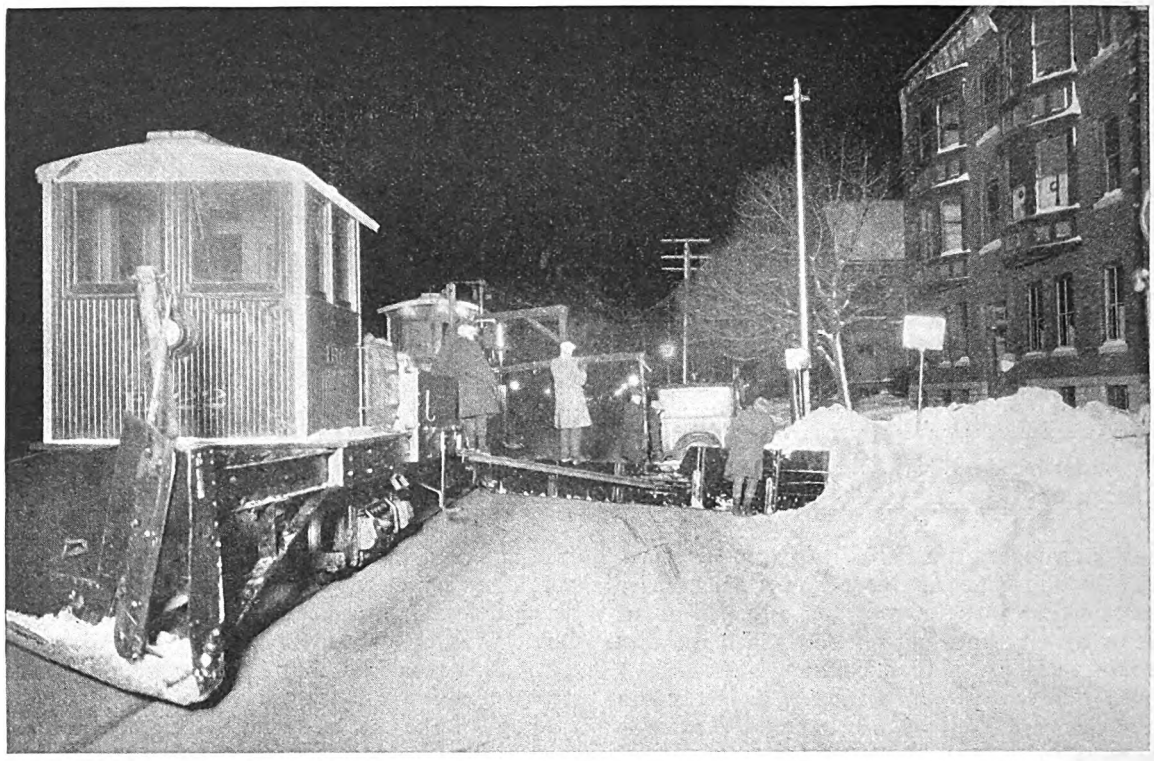
The changes in methods of operation were made with no labor turnover. Transfers of men from one service to another provided for all the additions and took care of those men displaced by extension of the use of one-man cars. So few men retired, left the service or were discharged that it was not necessary to hire any new men in the transportation department during last year.

The accident situation has shown a marked improvement. In the fall of 1926 accident prevention work was centralized under a safety director. Since then there has been a steady reduction in accidents of all classes from 6,247 to 4,180 in 1929, or 33 per cent. This result has been accomplished while there was an increase in registration of motor vehicles amounting to 33.8 per cent. Nevertheless, all accidents in which street cars and motor vehicles were involved have gone down 27.2 per cent. This result has been accomplished by careful instruction and follow-up work.

Many of the methods which have contributed to the great improvement in operation have been discussed in this paper from time to time. A complete summary of the achievements of the management at the time was given in the brief submitted in the Charles A. Coffin competition in 1927. This brief was abstracted in the JOURNAL, Dec. 31, 1927, page 1180. At that time, the projects were just coming into fruition. Now, three years later, the benefits have not only been retained, but in almost every department the records made then have been exceeded by a wide margin.

Downtown business section of Atlanta showing in the foreground the new Pryor Street viaduct which has made possible an improvement in service and a gain in schedule speeds

Digitized by Google



Wing plow of the International Railway, Buffalo, pushing back snow to the curb line

SNOW REMOVAL

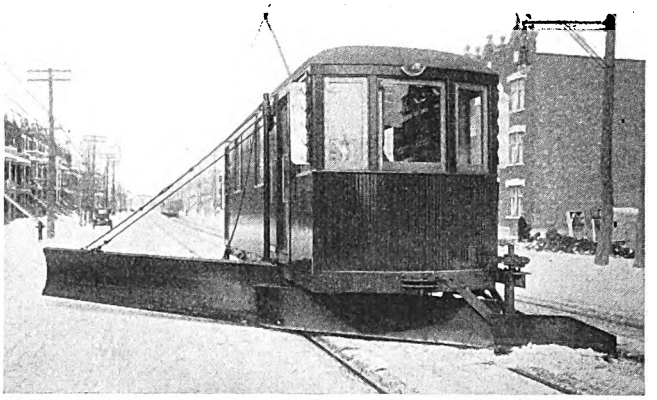
PROBABLY no emergency condition under which a railway is forced to operate demands faster or more efficient handling than that caused by a snowstorm. Preparedness in organization and equipment for snow removal, consequently, is one of the fundamental efforts of many railways. The following survey of snow-fighting methods used by more than a dozen companies in the United States and Canada shows that such preparation is effective and assures, in nearly every instance, the continuance of normal operation and service.

Notable progress in snow-removal practices has been made during the past two decades, not only by the railways but by city street departments as well. Gradually a closer co-ordination of effort on the part of these two agencies has resulted in a more effective distribution of the work to be done and a more economical use of machinery and labor utilized by each. Yet, under franchises, ordinances and operating agreements the railways continue to bear a great part of the expense of snow removal, not only from their own track areas but from the entire roadways used. A general survey of the operating arrangements in most cities shows that the railways are required to clear the snow and ice from their track areas at their own expense. In addition to this, they are charged a percentage of subsequent removal of the snow by the city's forces. Where this particular arrangement does not exist there is usually an alternative obligation whereby the railways completely clear snow and ice from certain streets and the city uses its equipment and forces on other main arteries.

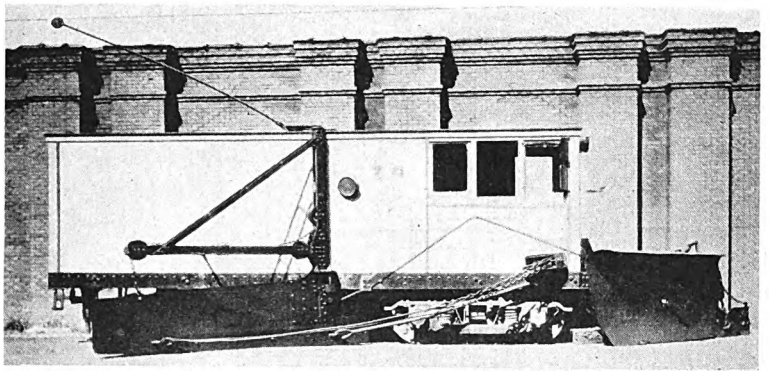
Various bases and scales are used upon which the charges for subsequent removal, after clearing, are made. In Montreal, the Montreal Tramways is required to pay half of the cost of removal. In Minneapolis, the Twin City Rapid Transit Company under agreement pays $\frac{1}{10}$ of the total cost of the removal of snow on a 40-ft. street, and $\frac{1}{60}$ of the total cost on a 60-ft. street. In St. Paul, this company is required to pay $\frac{1}{8}$ the cost of removing snow from any street on which there is a car line. The Toronto Transportation Commission, after clearing the snow from its tracks, is required to pay $\frac{1}{3}$ of this cost, while, under three fran-

Digitized by Google

In northern United States and Canada, where the snow and ice problem is greatest, railways are continually improving methods and equipment. Conditions and practices on twelve properties are summarized



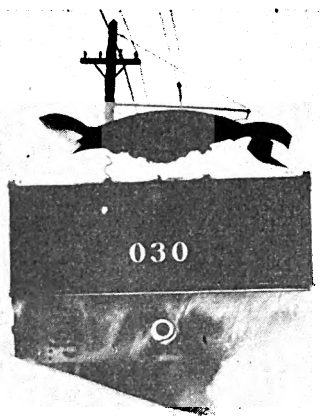
With both wings in action, this plow of the Montreal Tramways clears a path 18 ft. 6 in.



At left — Heavy-duty plow of the Twin City Rapid Transit Company

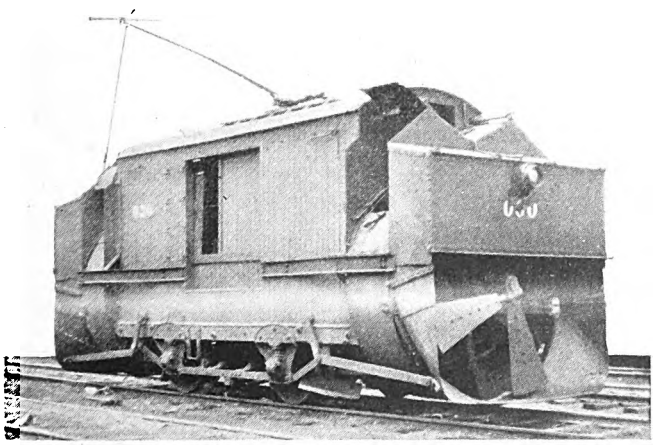
chises, the Duluth Street Railway pays for removal based upon the number of inches of snowfall reported by the U. S. Weather Bureau. Different operating arrangements are listed in the table accompanying this survey.

Because the problem of snow removal is a major one on the properties covered by this study, equipment, such as plows, sweepers and ice-cutters, as well as methods of organizing the actual work itself, has been given the utmost attention. Machinery has been developed to meet extreme conditions and to stand hard work. An example is the equipment used by the Montreal Tramways. Ten single-truck wing plows have been developed to accomplish two main purposes, clearing tracks of snow during storms and cutting down the ice which builds up on the devil strip from time to time during the winter season. With both wings in action, the effective snow clearing path of these plows is 18 ft. 6 in.

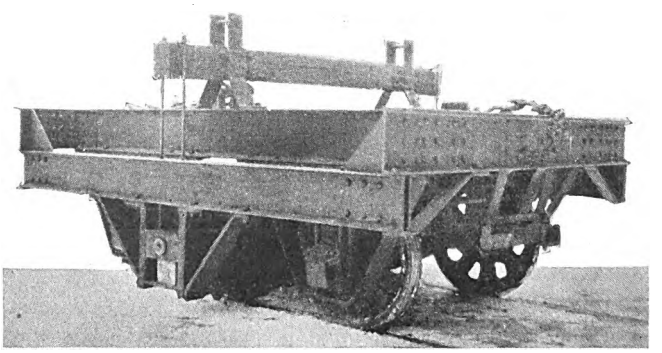


Rotary plow in action on the Wilkes-Barre Railway

The essential features of these plows are: (1) The strong, curved steel side wing, pivoted on the heavy vertical shaft at the front of the plow, and adjustable for height as required. This wing was carefully designed so that at operating speed the snow is effectively rolled back to the end of the wing. The wing is power-operated through a clutch on the driving motor by a rack and pinion with a connecting rod with universal joint attached to the back of the wing. This feature permits of easy movement of the wing allowing it to be used to advantage during storms in heavy downtown traffic. (2) The ice cutter on the devil strip, which consists of a heavy steel casting with inserted hardened teeth, is also pivoted on a vertical shaft. This cutter which, when not in use, folds back against the side of the plow, is hand-operated through a vertical shaft and chain



Adjustable hood and blades are features of the Wilkes-Barre rotary plow



Ice cutter built by the Duluth Street Railway to remove high centers

Digitized by Google

Comparative Data on Snow Removal Practices and Equipment

Railway	Operating Obligations Imposed by Franchise, Contract or Agreement	Snow Fighting Equipment Used on Street Car Routes	Materials and Methods Used for Keeping Track and Switches Open	Equipment Used on Bus Routes	Materials and Methods Used on Icy or Slippery Streets	Wages Paid for Snow Removal and Sanding Work
Montreal Tramways Montreal, Canada. Track-miles..... 302 Bus-miles..... 38	Company must keep tracks free from snow and ice. City removes snow from entire street, company paying one-half cost of carting.	35 single-truck sweepers. 7 double-truck sweepers. 2 double-truck rotary plows. 3 single-truck rotary plows. 10 single-truck wing plows. 11 salt cars.	Salt only. Applied by switchmen or hillmen at regular stations. For switches salt is mixed with snow. Salt cars are operated.	None. City cleans and removes snow from bus routes.	City uses cinders and sand, spreading by hand. Company spreads cinders by hand and sand with a mechanical spreader.	5 cents advance on regular rates to all employees on cars for snow removal. Does not apply to hillmen or switchmen.
Twin City Rapid Transit Company Minneapolis, Minn. Track-miles..... 520 Bus-miles..... 110	Company must remove snow from tracks. Under agreement company pays 19/40 of total cost of removing snow from a 40 ft. street and 19/60 from a 60 ft. street. In St. Paul pays ½ cost of removal on any car line street.	19 plows. (Described in survey).	Tracks and switches are thoroughly greased. Salt and gasoline are used for melting snow and ice.	None. City or county removes snow from bus routes.	Sand hauled in a motor truck and spread by hand only on necessary locations.	Regular rates.
Toronto Transportation Commission Toronto, Canada. Track-miles..... 255 Bus-miles..... 570	Commission plows track area. City removes snow from entire street, charging commission one third of total cost.	24 single-end sweepers. 4 double-end sweepers. 2 rotary plows. 4 work cars fitted with blades.	Switches are cleaned and salted at least twice daily.	3 Walter plows with cinder box. 1 Walter plow with wrecker. 1 Walter plow with dump body. 1 Walter plow with sander. 1 Fordson tractor plow. 2 sanders.	Commission cinders all bus stops. City sands hills along street car routes.	2 cents per hour additional to car sweepers and plow operators only; gasoline equipment operators and laborers regular rate. No overtime paid.
Duluth Street Railway Duluth, Minn. Track-miles..... 114 Bus-miles..... 35	Under three franchises, company removes snow and ice from tracks. City subsequently removes snow from entire roadway charging company a sum based on snowfall record of U. S. Weather Bureau.	5 railway plows. 2 double-end detachable plows on street cars. 4 single-end detachable plows on work cars. 3 detachable plows on motor trucks. 1 heavy ice cutter.	Calcium chloride on hard surface streets. Salt on unpaved streets. Applied by hand.	None. City or county removes snow from bus routes.	Cinders, fine gravel or sand. Usually use tire chains only on hilly routes.	Snow equipment crews, regular rates plus 25 per cent. Switchmen regular rates.
International Railway Buffalo, N. Y. Track-miles..... 450 Bus-miles..... 90	Franchise requires company to clear right-of-way and pay 25 per cent of subsequent removal. In practice equipment has been designed to remove snow from curb to curb on car line streets.	30 plows. 23 sweepers. 1 ice cutter.	Sand and cinders used on track. Salt on switches when necessary for melting snow.	18 sanding trucks. City removes snow from bus routes and company follows with sanders.	Spreads sand and cinders by mechanical devices. Under extreme conditions, salt is used.	Two-man rate for platform service plus half time.
Winnipeg Electric Company Winnipeg, Canada. Track-miles..... 121 Bus-miles..... 23	Company responsible for snow removal from tracks and 18 in. outside. If city engineer decides it is necessary, company must clear streets from curb to curb.	10 sweepers. 2 plows.	Sand on rail. Salt in switches for melting snow.	1 motor-driven plow and planers. City responsible for removal but company assists.	Cinders and sand spread at bus stops. Work is done by hand.	Regular rates.
United Electric Railway Providence, R. I. Track-miles..... 263 Bus-miles..... 161	No franchise obligations. Arrangement whereby company cleans and removes snow from certain designated streets and the city others dates back to old franchises.	3 sweepers. 46 plows.	Switches are kept salted during snow storms. Some calcium chloride used.	1 blade plow on a 5-ton truck. 5 sanders. City and county remove snow from bus-routes.	Sand applied by mechanical spreaders.	15 to 20 cents per hour in addition to regular rates. Sanding work for buses done by night track crew at regular rates.
Department of Street Railways, Detroit, Mich. Track-miles..... 435 Bus-miles..... 490	Railway dept. cleans and removes snow from all car and bus routes.	14 sweepers. 11 plows.	Salt.	Walter plows. Handy Andy sand spreaders.	Cinders and salt or sand and salt spread mechanically.	$1.00 per hour as compared to regular rates of 67 cents, 71 cents and 75 cents.
Springfield Street Railway Springfield, Mass. Track-miles..... 133 Bus-miles..... 99	By agreement with city, the company removes snow on certain streets from curb to curb. This is equivalent to total track area throughout city.	11 sweepers. 1 rotary plow. 7 plows.	Salt	None	City sands hills. Work is done by hand.	Time and one half for snow equipment work. Regular rates for sanding.
Cleveland Railway Cleveland, Ohio. Track-miles..... 403 Bus-miles..... 90	No franchise obligations. Company clears snow from track areas. City assists in downtown sections.	28 sweepers. 20 plows.	Salt.	Good Roads Machinery, 6 cu.yd. spreaders.	Salt mixed with sand spread mechanically. In extreme cold calcium chloride is used.	Time and one half for snow equipment work. No increase for sanding or salt work.
Pittsburgh Railways Pittsburgh, Penna. Track-miles..... 592 Bus-miles..... 126	No franchise obligations. City cooperates in downtown congested areas by cleaning snow and ice from street car stops.	39 sweeper cars. 17 scraper cars. 3 Fordson tractor plows. 3 auto trucks with plows.	Switchmen working in two-man crews and equipped with trucks or motorcycles clean and oil switches, spreading salt around them.	None	Granulated slag or cinders and salt mixed.	Regular rate plus 10 cents per hour if during working period. Overtime work, time and one half based on 80 cent per hour rate, extra men time and one half on 70 cent rate.
Eastern Massachusetts Street Railway Boston, Mass. Track-miles..... 610 Bus-miles..... 219	General practice, railway clears snow from tracks and levels at side. In some cases, city does subsequent removal, in others removal is done by railway.	62 plows. 39 sweepers. 1 ice breaker. 21 cars equipped with Root scrapers. 6 cars equipped with rotating broom under body.	Salt.	Best tractors. Walter tractors. Plows attached to trucks.	Sand spread from trucks by hand.	12 cents per hour in addition to regular one man rate. Automotive snow removal done by track or line department at regular rate.

Digitized by Google

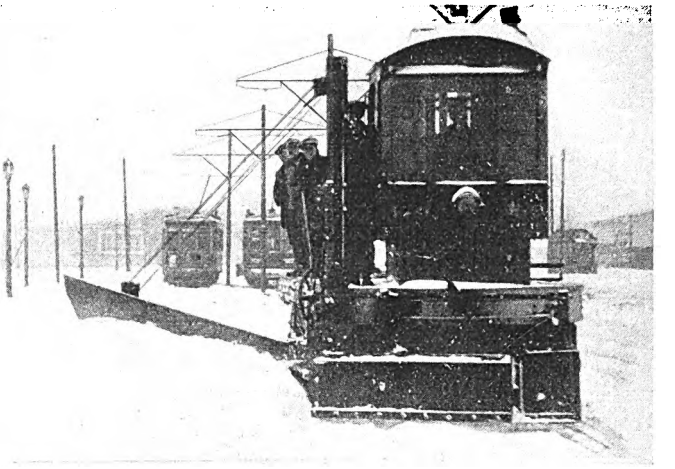
drive. In its working position this wing is braced from the rear by a sliding shaft held by a wooden dog, which will be sheared off if the cutter encounters very heavy ice or some solid obstruction. This permits the wing automatically to fold back to position against the side of the plow. The same protection is provided for the main side wing.

The usual operating height for the wing above the rail level is 2¼ in., but, where street surface conditions are known to be good, this can be reduced to as low as 1½ in. with advantage. The floor of the plow body is weighted with concrete to make available the full tractive effort of the two 50-hp. motors.

During the past winter, an unusually severe snowfall, accompanied by high winds and drifting snow for a considerable period, forced the Montreal Tramways to make improvements on equipment previously used on suburban lines. Deep cuts with vertical sides from 8 to 10 ft. high were formed over several miles of suburban track by the rotary plows. These cuts would be refilled by drifting snow within a very short time after the passage of the rotary. Two special plow equipments were designed with concave wings, 18 ft. long by 30 in. wide. These are hinged from a point about 5 ft. behind the rear truck. A chain tackle, hung from the hinge post, permits of a heavy steel wing being set at any desired angle from the plane of the rails. It can also be swung out at any angle in a horizontal direction, and held in position by chains. The free end of the wing points forward and thus pulls the snow on to the track instead of pushing it away, piling it up behind the rear truck, to be picked up and spread out over a wide area by a rotary plow following close behind.

The vertical sides of the bank, after several passages, are thus transformed into clean, smooth slopes at an angle of about 20 deg. from the horizontal. This contour allows drifting snow to be blown wide across the right-of-way instead of being pocketed between the vertical sides of the cuts. The final cleaning is done with sweepers.

The Twin City Rapid Transit Company has built nineteen snow plows in its own shop. They weigh approximately 80,000 lb. each. Trucks are equipped with four GE-73 motors, geared for slow speeds. The nose of the plow is hinged to a heavy frame in such a way that it can rise when it strikes rough track or hard paving blocks. Immediately back of the nose is a combined scraper and steel broom. Both the nose and the scraper broom are air-controlled, as is also a small extension to the plow nose. On the side of the plow is a large wing which throws the snow about 12 ft. beyond the outside rail. This wing is pulled in and out by means of an electrically operated windlass, and is raised or lowered by means of an air cylinder. Between the front and rear trucks is another air-operated combined steel broom scraper consisting of 5,200 steel cutting points which are very effective in removing ice.

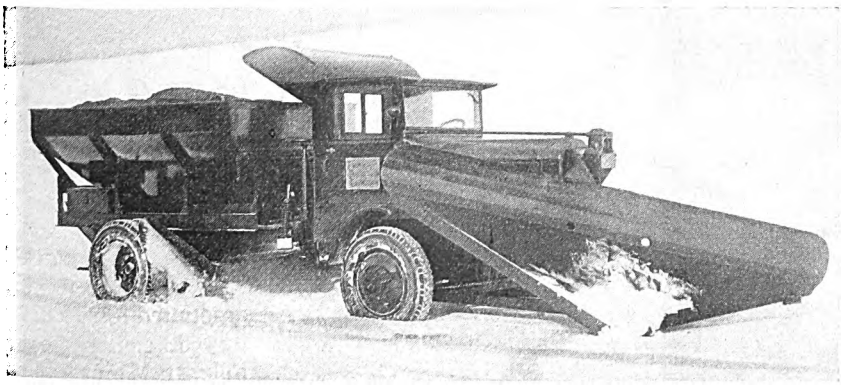


Toronto Transportation Commission snow plow at work on Lake Shore Road

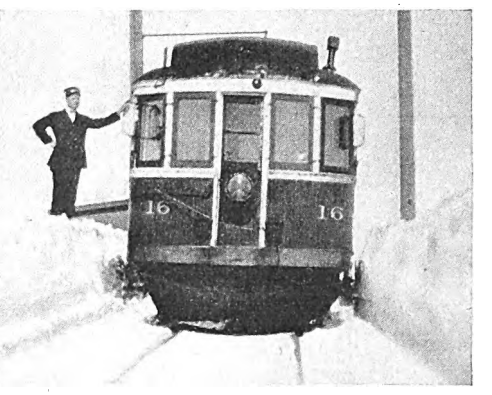
Street signs used in Montreal to warn motorists against parking during progress of snow removal

An ice cutter used by the Duluth Street Railway is shown in an accompanying photograph. It is used on car lines to cut down high ice ridges formed along and between street car rails. The cutter consists of a heavy steel cylinder, with cutter teeth or flanges inserted, which is mounted on a special car truck. This apparatus is either pushed or pulled by snow plows or work cars.

A rotary snow plow used by the Wilkes-Barre Rail-



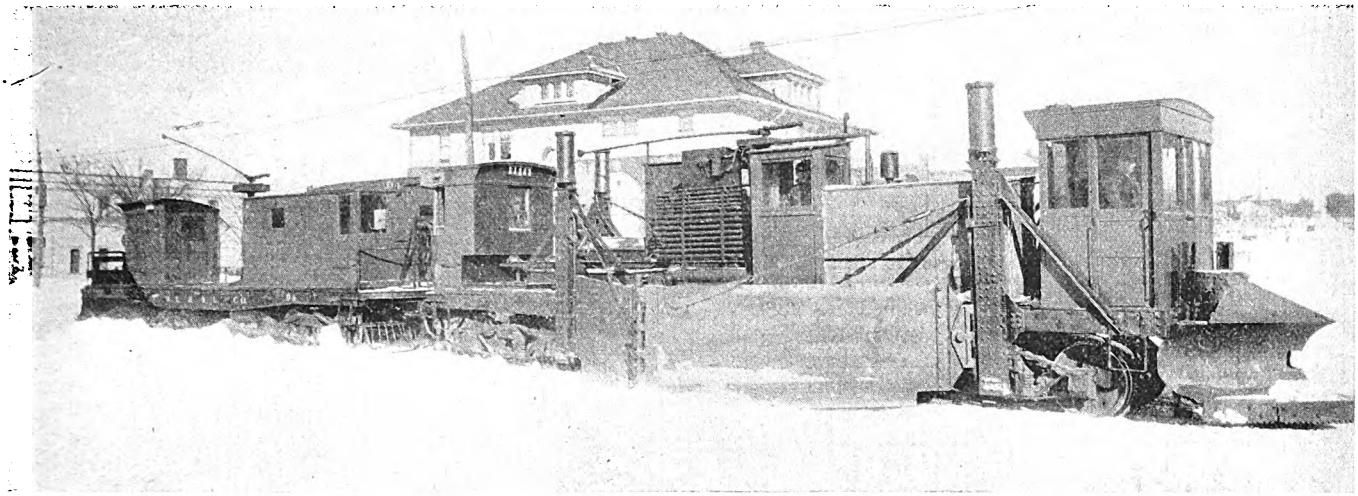
Highway plow and sander used to clear T.T.C. bus routes



Snow plow mounted under interurban car of the Winnipeg Electric Company

Digitized by Google

Digitized by Google



Heavy plow and scraper equipment developed by the Milwaukee Electric Railway & Light Company. Air-operated wing permits rapid movement

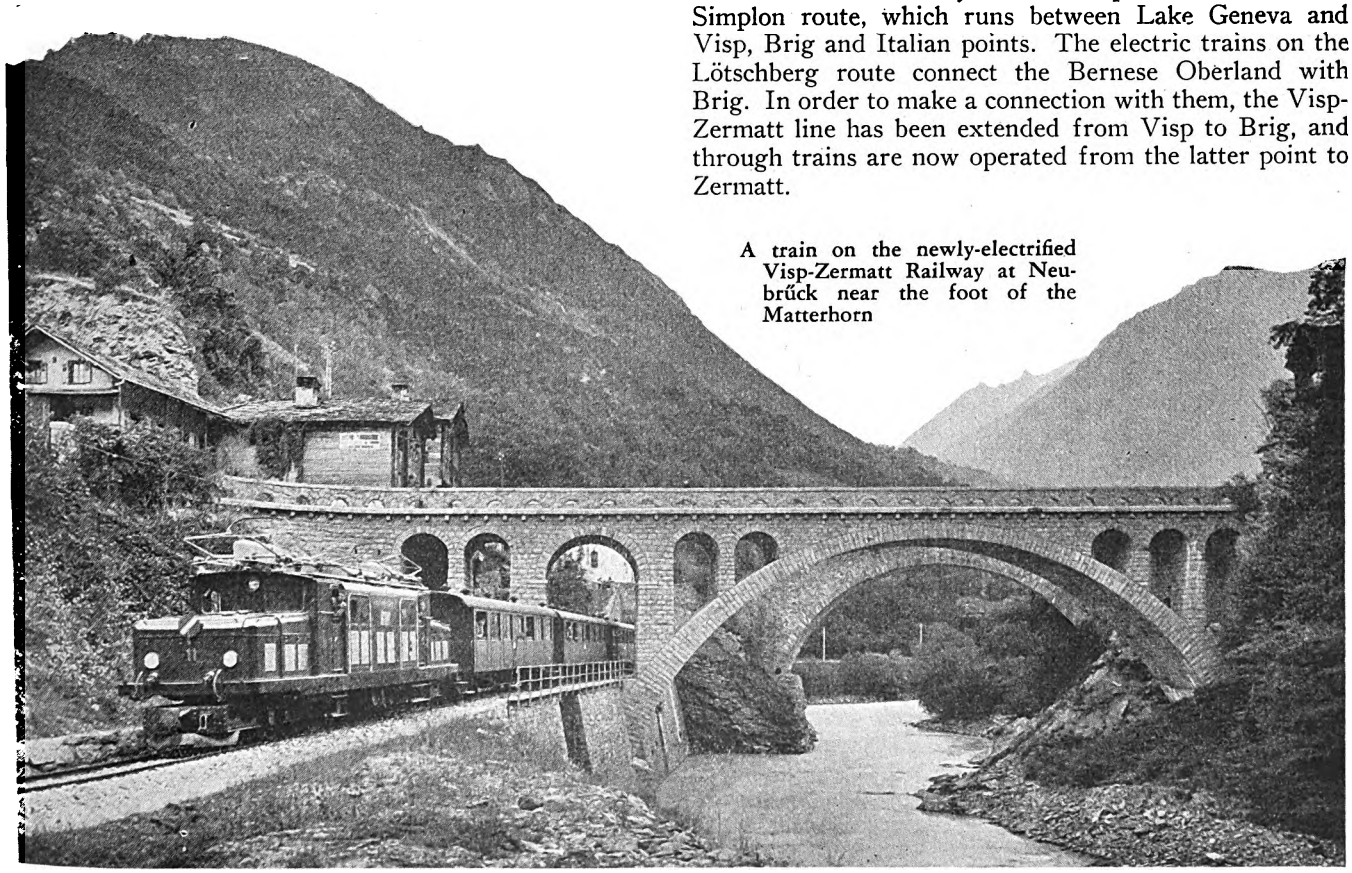
pany's cost for snow removal and sanding per single track mile during 1929 was $210, making the cost per car-mile 0.33 cent.

The average cost per mile of track for cleaning street car routes in Toronto for the past five years, 1926-1930 inclusive, was $799, and the average cost for cleaning bus routes was $576 per mile. The approximate cost per mile for 1930 was $854 for cleaning street car routes, and $633 for bus routes. As compared to this, the Pittsburgh Railways' cost per mile of track per year for removing snow and ice is $31, for sanding track made necessary by snow and ice, $45.

In 1929, the United Electric Railways, Providence, R. I., operated 12,098,000 car-miles and 4,199,000 bus-miles. The total cost of car snow work was $35,084, and of bus snow work $3,359, making the cost of car-mile 0.29 cent and per bus-mile 0.08 cent. The Duluth Street Railway's cost for snow and ice removal during 1929 was 0.34 cent per car-mile. In terms of snow vehicle-miles, the Cleveland Railway snow removal operation cost from 50 to 55 cents per car-mile.

Swiss Scenic Railway Electrified

ZERMATT, the famous Swiss town at the foot of the Matterhorn, is now reached by an electric railroad. The line between Visp (Viege) and Zermatt recently has been electrified. The line was opened with steam power in 1881. At Visp the trains connect with the Swiss Federal Railway electric express trains on the Simplon route, which runs between Lake Geneva and Visp, Brig and Italian points. The electric trains on the Lötschberg route connect the Bernese Oberland with Brig. In order to make a connection with them, the Visp-Zermatt line has been extended from Visp to Brig, and through trains are now operated from the latter point to Zermatt.



A train on the newly-electrified Visp-Zermatt Railway at Neubrück near the foot of the Matterhorn

Digitized by Google

A.I.E.E. Meeting Considers Railroad Electrification

Several important papers presented at technical session on this subject. Inspection trips made to important projects in Philadelphia and vicinity

RAILROAD electrification was one of the major topics at the sixth Middle Eastern district convention of the American Institute of Electrical Engineers held at Philadelphia, Pa., Oct. 13-15. One entire session was devoted to the subject, and several inspection trips were made to local installations.

Six important papers were presented at the technical session on electrification held Wednesday morning, which was presided over by G. I. Wright, engineer electric traction the Reading Company.

C. L. Doub, assistant engineer of the same company, presented a discussion of the power supply facilities for the suburban electrification which is now being installed by the Reading in Philadelphia and surrounding territory. The facilities are being planned so that the electrification may readily be extended to include through passenger and freight service between Philadelphia and New York City, Bethlehem and Reading, Pa. Contract has been made with the Philadelphia Electric Company for initial power requirements, and provisions are made for enlarging such supply to serve all of this territory.

The railroad is constructing substation and transmission facilities to serve the suburban territory by a 12,000-24,000-36,000-volt, three-wire, single-phase, 25-cycle distribution system, with the view to reaching the more remote area by superimposing 66,000-volt transmission lines upon the initial system at the time of future extensions. The present and proposed layouts are described in the paper together with the estimated power requirements and the manner in which the railroad system is to be served from the power company network.

Utilization of railroad right-of-way for electric power transmission and co-ordination with railroad electrification was the subject of a paper by W. W. Woodruff, superintendent of aerial lines Philadelphia Electric Company, and G. I. Wright, engineer electric traction the Reading Company. It was pointed out that the use of the Reading right-of-way made feasible the entrance into the heart of Philadelphia with overhead transmission at high tension of the power required for many industries. The difficulties that were encountered and the financial and management problems that had to be solved were considered in some detail. It was pointed out that a prime requirement was that the operation of the railroad or its future expansion should not be hampered, while the electric companies interested should obtain a permanent right-of-way where the securing of an independent route would be practically out of the question.

Steps taken in initiating the Pennsylvania Railroad electrification in the Philadelphia district were explained in a paper by H. C. Griffith, assistant electrical engineer of that railroad. The operating practice, the functions of the power director and those associated with him in switching and grounding circuits for safeguarding the personnel were discussed.

Other papers presented included a description of the substations for the new Broad Street subway by H. M. Van Gelder, electrical engineer department of city transit, Philadelphia; use of oil-electric or gas-electric locomotives and motor cars as an adjunct to electrification, by A. H. Candee, Westinghouse Electric & Manufacturing Company; and modern single-phase motors for railway electrification, by F. H. Pritchard and Felix Konn, General Electric Company.

Following the presentation of the papers, a lively discussion took place. Sidney Withington, New Haven Railroad, called attention to the rapid development of mercury vapor rectifiers for railway service within the year, mentioning particularly their use on the Lackawanna. While use of the railroad right-of-way for power transmission is very interesting, he feels that the railroads must be careful not to permit construction that will in the future impose restrictions on track developments. In connection with the load curves for the Reading shown by Mr. Doub, he pointed out that the load factor of an electrification can be increased greatly by inclusion of freight service, most of which is handled in the non-peak hours.

J. V. B. Duer, electrical engineer Pennsylvania Railroad, sees only a small field for self-propelled cars on electrified systems. The improvements in single-phase motors he considers are of great importance.

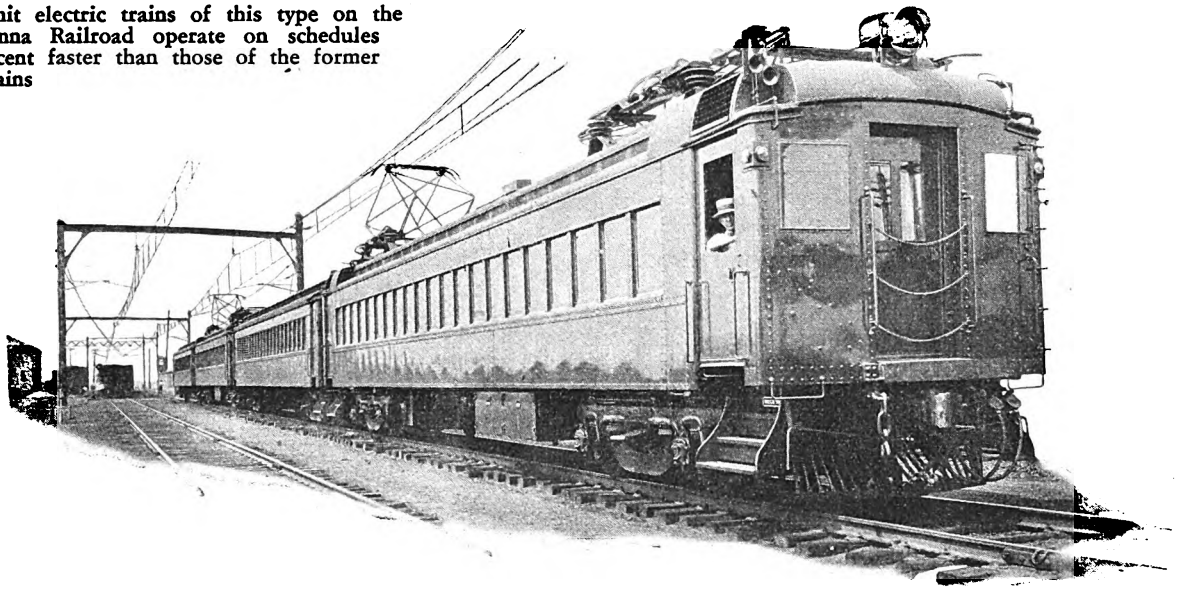
J. H. Davis, electrical engineer Baltimore & Ohio Railroad, regretted that no reference was made in the papers presented to inductive co-ordination. In the future, greater attention will be given to the joint use of railroad rights-of-way, he believes.

Other speakers taking part in the discussion included R. A. Hentz, Philadelphia Electric Company; H. L. Andrews, General Electric Company; F. H. Shepard and C. E. Skinner, Westinghouse Electric & Manufacturing Company; F. W. Harvey, Gibbs & Hill; H. M. Van Gelder, city transit department, Philadelphia, and J. J. Linebaugh, Jackson & Moreland.

On Tuesday afternoon, the Pennsylvania Railroad placed a special train at the disposal of the delegates, and an inspection was made of the improvements in the Philadelphia district, including the new passenger station and the Lamokin Street substation. Wednesday afternoon the Reading Company provided a special train for inspection of the progress of its electrification, the trip including the overhead construction between Reading Terminal, Wayne Junction and Jenkintown, the substation of the Philadelphia Electric Company at Plymouth Meeting, and the 66,000-volt transmission line of the latter company over the Reading tracks between Conshohocken and Philadelphia. At Oreland, a demonstration of stringing trolley for a two-wire catenary system was given.

The attendance at the meeting was more than 500.

Digitized by Google



Multiple-unit electric trains of this type on the Lackawanna Railroad operate on schedules 25 per cent faster than those of the former steam trains

SCHEDULED SPEED

Increased by Electrification

Rapid acceleration and braking rates of new electric trains have enabled Lackawanna Railroad to reduce running time by approximately 25 per cent between Hoboken and stations in suburban zone. Free running speed also higher than that of steam trains formerly operated

SUBSTANTIAL reductions in running time in electrified suburban service were made by the Delaware, Lackawanna & Western Railroad on Sept. 28, coincident with the change from daylight-saving time to Eastern standard time. This increase in scheduled speed has been made possible by the rapid acceleration and braking rates of the new multiple-unit electric trains, as well as their higher free running speeds as compared with the steam trains formerly operated.

The new schedules affect the electric service between Hoboken and South Orange on the main line, and between Hoboken and Montclair on the Montclair branch. Substitution of electric trains for steam trains on the Montclair branch began early in September, and was completed about the middle of the month. The changeover of the Hoboken-South Orange service on the main line was then commenced. This was completed just prior to the inauguration of the new schedules. Steam operation has been continued for the present to points west of South Orange, and no change has been made in running time. It is expected that electric service will be in operation on the main line as far as Dover and on the Passaic and Delaware branch to Gladstone by about the first of next year. Faster schedules will then be inaugurated for these services.

With the change in schedules, the average running time westbound between Hoboken and Montclair was reduced from 34 minutes to 27 minutes, which is equivalent to an increase in speed from 23.1 m.p.h. to 29.2 m.p.h. The running time of the fastest train was reduced from 27 minutes to 21 minutes, with a corresponding increase in speed from 29.2 m.p.h. to 37.5 m.p.h. Eastbound, the average running time was reduced from 30½ minutes to 26 minutes, with a corresponding increase in average speed from 25.8 m.p.h. to 30.1 m.p.h. The running time of the fastest express from Montclair to Hoboken was reduced from 23 minutes to 19 minutes, while the speed was increased from 34.2 m.p.h. to 41.3 m.p.h.

It will be noted that the average time saving is greater in the westbound service than in the eastbound, being seven minutes in one instance and only 4½ minutes in the other. This is due to the fact that there is a fairly heavy grade westbound between Newark and Montclair. The greater ease of starting the multiple unit electric trains as compared with the steam trains has made possible a considerable saving in time westbound. On the east-

Digitized by Google

Comparison of Schedules, South Orange Service

Running Time, Minutes	Number of Trains* Eastbound Schedule New	Eastbound Schedule Old	Westbound Schedule New	Westbound Schedule Old
24	1	..	1	..
25	4	..	1	..
26	1	..	..	..
27	2	..	5	..
28	15	..	3	..
29	..	..	12	..
30	1	..	3	..
31	1	1	..	..
32	1	..	1	2
33	..	2	..	..
34	..	3	..	1
35	..	4	..	1
36	..	6	..	6
37	..	1	..	2
38	..	4	..	8
39	..	..	..	1
40	..	4	..	3
41	..	..	..	1
42	..	1	..	..
43	..	..	..	1
	26	26	26	26

*Does not include trains to and from points west of South Orange although many of these trains also serve territory between South Orange and Hoboken.

Effects of Electrification, South Orange Service

	New Schedule	Old Schedule
Average running time—east	27½ minutes	36½ minutes
Average running time—west	28½ minutes	37½ minutes
Average speed—east	30.2 m.p.h.	22.8 m.p.h.
Average speed—west	29.3 m.p.h.	22.3 m.p.h.
Express running time—east	24 minutes	31 minutes
Express running time—west	24 minutes	32 minutes
Express speed—east	34.8 m.p.h.	27.0 m.p.h.
Express speed—west	34.8 m.p.h.	26.0 m.p.h.

Effects of Electrification, Montclair Branch

	New Schedule	Old Schedule
Average running time—east	26 minutes	30½ minutes
Average running time—west	27 minutes	34 minutes
Average speed—east	30.1 m.p.h.	25.8 m.p.h.
Average speed—west	29.2 m.p.h.	23.1 m.p.h.
Express running time—east	18 minutes	23 minutes
Express running time—west	21 minutes	27 minutes
Express speed—east	41.3 m.p.h.	34.2 m.p.h.
Express speed—west	37.5 m.p.h.	29.2 m.p.h.

Comparison of Schedules, Montclair Branch

Running Time, Minutes	Number of Trains Eastbound Schedule New	Eastbound Schedule Old	Westbound Schedule New	Westbound Schedule Old
19	1	..	..	..
21	1	..	1	..
22	..	..	1	..
23	..	1	1	..
24	1	..	1	..
25	1	1	1	..
26	20	..	3	..
27	6	..	21	2
28	1	..	4	..
29	2	..	..	1
30	..	16	1	2
31	..	7	2	1
32	..	4	..	..
33	..	4	..	8
34	..	..	..	6
35	..	..	1	5
36	..	..	..	3
37	..	..	..	1
38	..	..	..	3
39	..	..	..	1
41	..	..	..	1
	33†	33†	37*	34*

*One additional train terminates at Watsessing Avenue Station.
†Four additional trains start at points east of Montclair.

bound down grade this advantage is less clearly evident. Despite the greater improvement in westbound running time, however, the average speed eastbound remains somewhat higher than the average speed westbound on the new schedule as it was on the old.

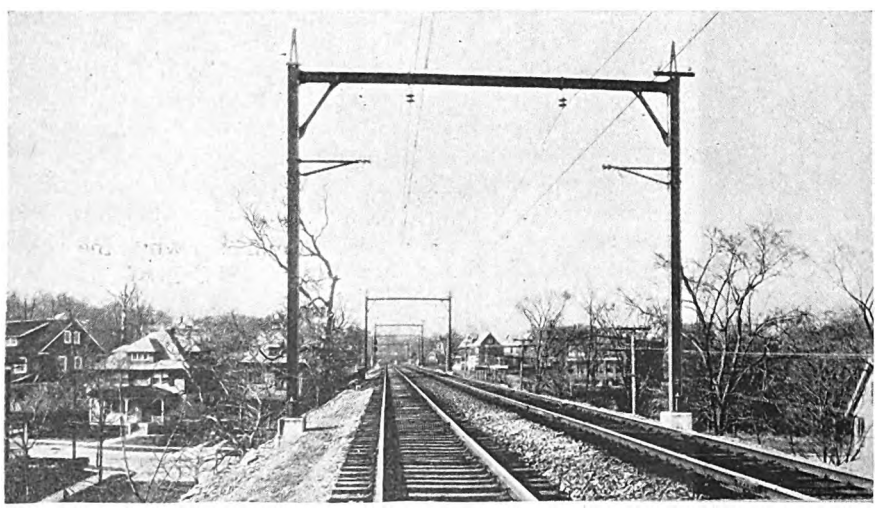
In the South Orange service, the average running time westbound has been reduced from 37½ minutes to 28½ minutes, corresponding with an increase in speed from 22.3 m.p.h. to 29.3 m.p.h. Eastbound the running time has been reduced from 36½ minutes to 27½ minutes, while speed has increased from 22.8 m.p.h. to 30.2 m.p.h. The running time of the fastest train was cut from 32 minutes to 24 minutes westbound and from 31 minutes to 24 minutes eastbound. Speeds were increased from 26 m.p.h. westbound and 27 m.p.h. eastbound, to 34.8 m.p.h. in both directions at present.

From these figures it will be seen that there is a saving of nine minutes in average running time in both directions for the South Orange service. This is somewhat greater than the saving for the Montclair service, because there are more intermediate stops where the advantages of multiple-unit operation are experienced. Between Newark and South Orange there is a slight grade westbound, enough to cause a slight difference in eastbound and westbound speeds, but not so pronounced as on the Montclair branch.

Generally speaking, the changes effected on the new schedules have reduced the running time approximately 25 per cent. This saving is utilized by the westbound trains to reach their destinations earlier. The eastbound trains, on the other hand, are scheduled to leave later and to arrive at Hoboken at approximately the same times as before.

The new schedules call for the operation of a substantially larger number of trains than were in operation a year ago. On the Montclair branch the number of daily trains westbound has been increased from 35 to 38, the additional trains being scheduled between 8 o'clock in the evening and midnight. The number of eastbound trains remains at 37. In the electric service between Hoboken and South Orange, the daily number of trains remains 26 in each direction, as it was on the old schedule. Many trains operating to points west of South Orange, however, serve also the territory between that station and Hoboken. In this connection it should be noted that a total of 38 additional trains were placed on the schedule last spring when electrification was under way but before electric trains commenced operation. These 38 trains have all been retained on the new schedule.

The increased comfort of travel as a result of electrification is marked and has elicited much favorable comment. The existence of a long tunnel just west of the Hoboken terminal was always an element of discomfort with the steam service, because headways were too short to allow the locomotive smoke and gases to leave the tunnel in the intervals between the passage of trains. This difficulty has been almost entirely eliminated with electric operation. Moreover the electric service is much cleaner and quieter than the steam service. This improvement is greatly appreciated both by the passengers and the residents of the towns along the line.



Suburban communities on the Lackawanna Railroad between Hoboken and South Orange and on the Montclair branch now have electric service

Digitized by Google

Some of the 20,000 taxicabs operated in the City of New York

Regulation of Taxicabs *as a Public Utility* RECOMMENDED IN NEW YORK

Report by Mayor's commission urges operation under a single franchise in co-ordination with all other transit agencies, and advises the issuance of certificates of convenience and necessity to a limited number

ESTABLISHMENT of the taxicab industry in New York City as a public utility, under the jurisdiction of a bureau of taxicab control in the Board of Transportation, was recommended in a comprehensive report made public recently by Mayor Walker's commission on taxicabs. The report recommends operation under a system of certificates of public convenience and necessity, to be issued by the new bureau to individuals and organizations who comply with strict standards of financial responsibility and public safety outlined in the report.

The report expresses the commission's strong conviction that the ultimate solution of the taxicab problem is is operation under a single franchise in co-ordination with all other local transit agencies. It urges that its recommendations be carried out with this goal in view. For the present, the report explains, the certificate system is advocated in order to protect the rights of thousands of owner-operators now engaged in the industry and to give them an opportunity to prepare for future changes.

Single Franchise Urged

The commission's belief in operation under a single franchise as the real cure for the present evils of the industry is voiced repeatedly. It is found in a "summary of conclusions" and also an "outline of facts" which are incorporated as separate divisions of the document. The certificate system is frankly described as a stepping

Digitized by Google

stone to a franchized monopoly, delayed out of consideration for the nearly 10,000 individuals now gaining a livelihood by operating their own cabs.

The commission on taxicabs was appointed by Mayor Walker last Spring after he had vetoed the Board of Alderman's taxicab ordinance which sought to increase the prevailing rates. It is headed by Frank P. Walsh, its other members being Leonor L. Loree, Philip Le Boutillier, Col. George W. Mixter and Daniel L. Reardon. The commission was assisted in its work by Leland Olds, economist, and J. I. Metcalfe, engineer. Its investigation of the industry in New York and in other cities is regarded as the most thorough ever undertaken by a municipality.

Among other things, the report recommends restriction of the number of cabs operating on the city's streets, adoption of the prevailing rate of 15 cents for the first quarter-mile and 5 cents for each succeeding quarter as a uniform rate, and the raising of the annual license fees for cabs to $50 and those for drivers to $10 a year.

The granting of certificates of convenience and necessity only to those operators who can show financial ability to meet all liabilities, as well as ability to operate on sound business lines is urged. It is also recommended that the Board of Transportation bureau have wide regulatory power. The bureau would have the power to fix uniform rates and service standards, grant and revoke certificates, approve and revoke transfers of certificates, and determine prior rights on cab color schemes, the adoption of which is suggested as a preliminary requirement for a certificate. The report also urges that the bureau be empowered to investigate accidents, prescribe submission of regular reports and adoption of a uniform system of accounts by certificate holders, establish a hack stand program, set up conditions of labor and qualifications for drivers, conduct investigations, and, in general, exercise all power required for effective regulation of the industry.

Would Reduce Number of Cabs

An important recommendation of the commission calls for issuance of certificates to the 19,000-odd cabs now operating, but terminable to them when they go out of business, that period in no case to exceed three years. The report suggests that about 14,000 cabs are sufficient to meet the city's present needs.

A preliminary statement embodied in the transmitting letter which sent the report to Mayor Walker described the general situation found by the commission as the result of twelve public hearings, held during the past summer, and the private investigations which followed.

"Your commission finds the taxicab industry in New York City to be in a thoroughly unhealthy condition," the statement declares. It goes on to say that this condition causes many otherwise avoidable accidents, and places the industry largely in the hands of irresponsibles unable to finance the liability for such accidents. Labor instability is also attributed to the present system of operation. Declaring that drastic changes in organization must be made to cure existing ills, the statement adds that the industry "must be encouraged in its inevitable transition to a full grown member of the public utility family."

The report is a voluminous document, including not only the commission's conclusions and recommendations, but also a mass of detailed evidence upon which they are based. These data cover exhaustive studies of conditions in all large American cities and the principal foreign municipalities where taxicab operation is an important transportation factor. This part of the report treats in detail such elements of the taxicab industry as general organization, accidents and safety, cruising and hack stands, rates of fare, the "purpose-built" cab, the cab industry as a public utility and the problem of cab transportation as part of a unified system.

Important Recommendations Made

Among the specific recommendations contained in the report are the following:

That the taxicab industry of New York City be declared to be a public utility and be placed under the jurisdiction of a taxicab control bureau in the Board of Transportation, with authority to assure proper control of the entire industry.

That operation of taxicabs on the streets of New York City be subject to the grant of a certificate of public convenience and necessity issued by the taxicab control bureau on the basis of conditions subsequently enumerated, with power of revocation.

That existing cab owners' licenses to operate cabs on the streets of New York City be granted such certificates covering the operation of cabs now operated, but terminable as to each such cab with its life, and not in any case for more than three years.

That where there is failure to operate any cab for any reason over a period of 60 days or, at the end of the three-year period, the certificate covering the operation of that cab shall lapse and shall be awarded as a new certificate only to the operation capable of demonstrating that public convenience and necessity require such additional cab and that it possesses the ability to utilize it economically and efficiently.

Requirements for Certificate

That the granting of new certificates be based upon demonstrated need for the number of cabs for which certificates are requested as well as upon the operator's establishing the following: ability to assume full financial responsibility for all liabilities incurred; ability to conduct an efficient and economical operation along good business lines; and the adoption of a color scheme or emblem, or both, not encroaching on the established good will of any operation.

That the taxicab control bureau given jurisdiction over the industry be given power to: grant and revoke certificates of public convenience and necessity as defined above; approve and revoke transfers of certificates of convenience and necessity; fix uniform rates and service standards, starting with the 15-5 rate; prescribe the submission of regular reports from all taxicab operations; require a uniform system of accounts to be kept by all taxicab operations; investigate accidents; establish specifications for taxicabs and their condition, including safety equipment, taximeters, etc.; prepare a program for hack stands and establish methods of operation which will eliminate unnecessary cruising; establish employee working conditions necessary to safe and efficient operation, and establish qualifications for drivers.

That the hack bureau of the Police Department shall be continued with its present organization and powers.

That certificates of convenience and necessity issued by the taxicab control bureau be assignable with the consent of such body, but that in no instance shall this body give its consent to such assignment where the consideration for the transfer is in excess of the price fixed by the regulatory body.

That a single rate of fare be established for all taxicabs operated in the city of New York and that for the present this be the prevailing rate of 15 cents for the first quarter-mile and 5 cents for each succeeding quarter-mile, with prevailing extras.

Present System Assailed

The commission's recommendations are based on an elaborate set of findings of fact, which, in turn, is summarized in a set of conclusions embodied in the report. The report declares that the taxicab industry here is, from a business standpoint, one of the most poorly operated industries of its size in the country, due mainly to excessive competition among the nearly 10,000 separate owners who operate its 19,500 cabs.

The conclusions describe as an outstanding evil the fact that there are 68,397 drivers for 19,507 cabs, with a resulting high labor turnover. This, the report asserts, undermines the safe and efficient conduct of the

Digitized by Google

industry. Excessive cruising is found to be a significant factor in the way of safe and economical operation.

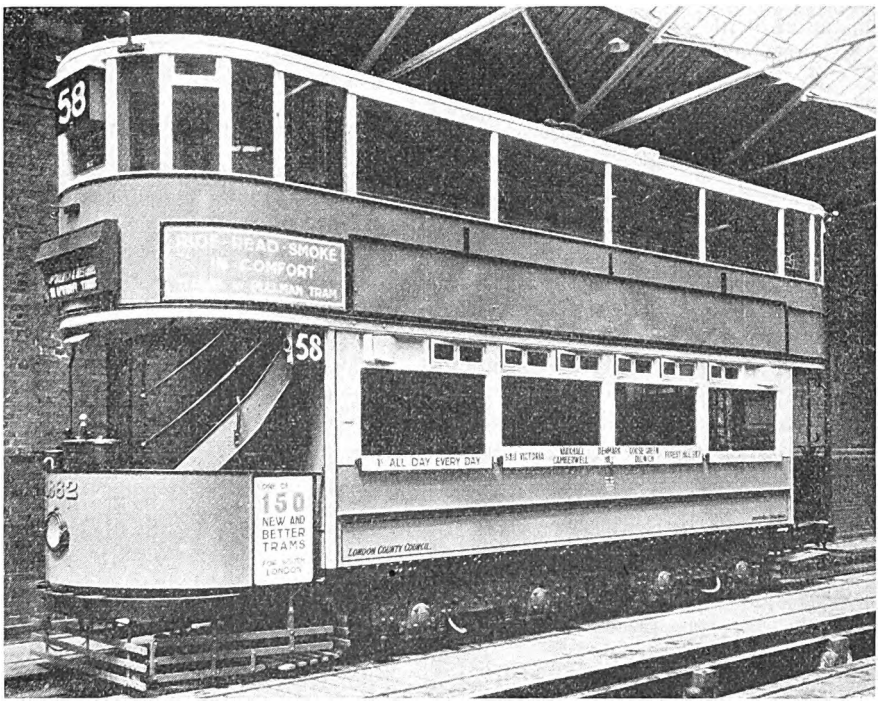
On the basis of the facts brought out in its investigation, the commission finds the present prevailing rate to be adequate if 50 per cent paid mileage can be obtained. Placing of the industry on a business basis, with unnecessary costs to present disorganized conditions eliminated, would make possible lower operating costs, which could be shared with the public either in better service or further reductions in fare, the commission finds.

After describing the magnitude of the industry, with its 346,000,000 passengers a year and its annual income of $144,000,000, including tips to drivers, the commission comes to the conclusion that it must be recognized as "a full-fledged public utility" with proper organization and public control.

"The unifying of the city's taxicab service under a single franchised corporation," the commission finds, offers manifest advantages, many of which cannot be fully attained so long as diversity of operation remains. The advantages of unified operation in terms of economical utilization of cabs and reduction of traffic congestion are especially noteworthy.

"The possible advantages of co-ordinating taxicab operation with the city's general rapid-transit system should be further explored. In Philadelphia, Kansas City and Grand Rapids, such co-ordination has been adopted as a definite public policy, while the trend seems to be in that direction in Cincinnati. The theory is that the general transportation needs of a city can be most economically and satisfactorily met by the combined operations of all transit facilities, in which each supplements the other in resources and services."

L.C.C. Trams Get Low-Level Cars



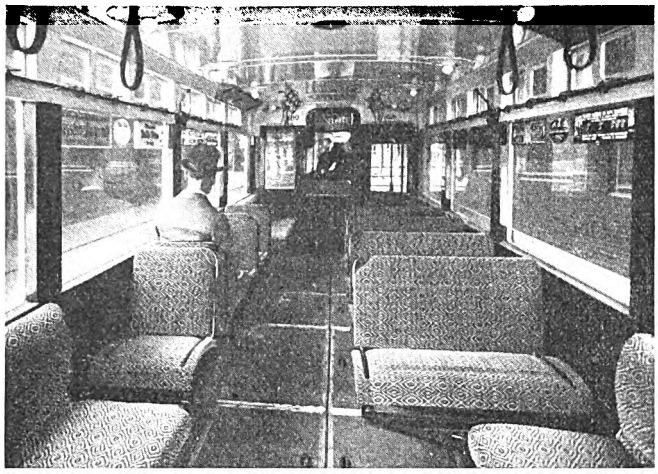
One of the new tramcars just put in service by the London County Council Tramways

DOUBLE-TRUCK tramcars of a new type have recently been placed in service in South London by the London County Council Tramways. Of the 150 cars ordered, 100, designated as Class E-3, are equipped with two motors on maximum traction tracks for fairly level routes, and 50, of Class HR-2, have low-level four-motor trucks for use on hilly routes. The bodies of all are alike.

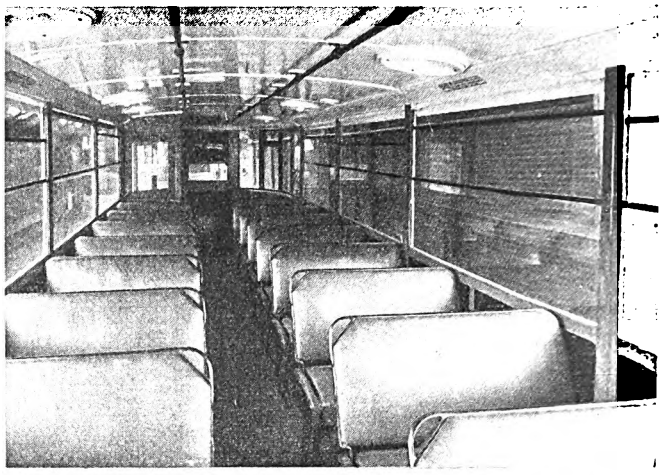
The cars are a development from the type tried experimentally last year. The general arrangement is shown in the illustrations. They are of the double-deck type, 33 ft. 10 in. over-all, and arranged for two-man operation. Each car seats 74 passengers, 28 on the lower deck and 46 on the upper deck. In the lower salon the upholstering is L.C.C. standard moquette, while on the upper deck a non-inflammable red leather substitute is used. On both decks, the floor is covered with battleship linoleum. The headlining is made of $\frac{3}{8}$-in. plywood. The side framing on the lower deck is of teak wood with interior finish of Honduras mahogany. On the upper deck the framing is made almost entirely of interchangeable die castings in Alpax metal, having high tensile strength. The outer panels for the roof covers consist of hard-rolled sheets of aluminum alloy in one width.

The outside paneling of the upper deck is of high

Digitized by Google



Wide windows and comfortable seats are features of the new cars. This illustration shows the lower deck



The upper decks of these new cars are totally inclosed and are fitted with upholstered seats

tensile aluminum alloy plate while the lower paneling is of mild steel plates, forming stiffening members for the car framing. The under-framing and main side posts are of pressed steel sections, electrically welded with supplementary rivets or bolts at points of severe strain.

Non-shatterable safety glass is used for windows and panels that are most liable to damage. Roller curtain destination signs are installed in the ends of the car.

For the 100 Class E-3 cars standard maximum traction trucks are used. The 50 Class HR-2 cars have swiveling trucks with wheels of equal size. All the journals are fitted with SKF roller bearings. The motors are also fitted with roller bearings of the same make. The wheels of the four-motor cars are 26½-in. diameter, mounted on 4½-in. axles. The truck wheelbase is 4 ft. 9 in., and the distance between truck centers is 11 ft. The minimum radius of curvature around which the cars will pass is the L.C.C. standard of 40 ft.

Each of the HR-2 cars carries four Metropolitan Vickers No. MV-109 motors, rated 30 hp. at 262½ volts, the pair of motors on one truck being connected in series. The E-3 cars have two English Electric DK-126-A motors, each rated 57.5 hp. at 525 volts.

The controllers of the class E-3 cars were built by the English Electric Company. They are of the two-motor series parallel cam-operated contactor type, with magnetic brake. The controllers of the HR-2 cars were manufactured by the Metropolitan Vickers Electrical Company. They differ from the others in being arranged for four motors.

Details of the equipment are given in the accompanying table.

Buenos Aires' New Subway

WORK on the first section of the new underground railway which will run from the Buenos Aires Central Railway station to the port at Callao is rapidly nearing completion. The first 4½-mile section was opened recently. The length when the line is completed will be 5½ miles. The subway, which is being built by the Buenos Aires Central Railroad & Terminal Company, is expected to carry 200,000 passengers a day with an estimated revenue of £300,000 a year. Delivery of the entire order of 56 cars for the system will soon be completed.

Specifications of the 150 New Cars for London County Council Tramways

E-3 UNITS

Number of E-3 units	100
Type of unit	Double-deck, two-man, motor, passenger, city, double end, double truck
Number of seats	74; 46 up—28 down
Builder of car body	Hunt Nelson & Co., Ltd., Motherwell, Eng.
Date of delivery	1930
Bolster centers	10 ft. 4½ in.
Length over all	33 ft. 10 in.
Length over body posts	22 ft. 2 in.
Truck wheelbase	4 ft. 6 in.
Width over all	7 ft. 1 in.
Height, rail to trolley base	15 ft. 7 in.
Body	Semi-steel
Roof	Arch
Doors	End
Brakes	Magnetic
Armature bearings	Roller
Axles	5 in. and 4 in.
Car signal system	Atmospheric air type
Control	English Electric Co. series-parallel
Destination signs	Illuminated curtain
Floor covering	Battleship linoleum
Gears and pinions	20 deg. involute
Glass	Non-shatterable in exposed parts
Headlining	⅜-in. Tucker plywood
Interior trim	Honduras mahogany below; light and antique oak above
Journal bearings	Roller
Journal boxes	SKF
Lamp fixtures	Silvalux, 10 in. lower, 10 in. upper deck
Magnetic brakes	Estler Bros., Ltd.
Motors	Two English Electric No. DK-126A, outside hung (57 5 hp.)
Painting scheme	Vermilion and cream
Roof material	Aluminum alloy sheets
Sash fixtures	"Windsor"
Seats	G.D. Peters & Co.
Seating material	Moquette below; leather cloth above
Steps	Stationary
Trucks	Electro-Mechanical Brake Co., Ltd.
Ventilators	4 Ashanco and Venturi air-extracting units
Wheels, type	Steel, diameter 31¾ in. and 21¾ in.
Wheelguards	Hurst, Nelson & Co., Ltd.

HR-2 UNITS

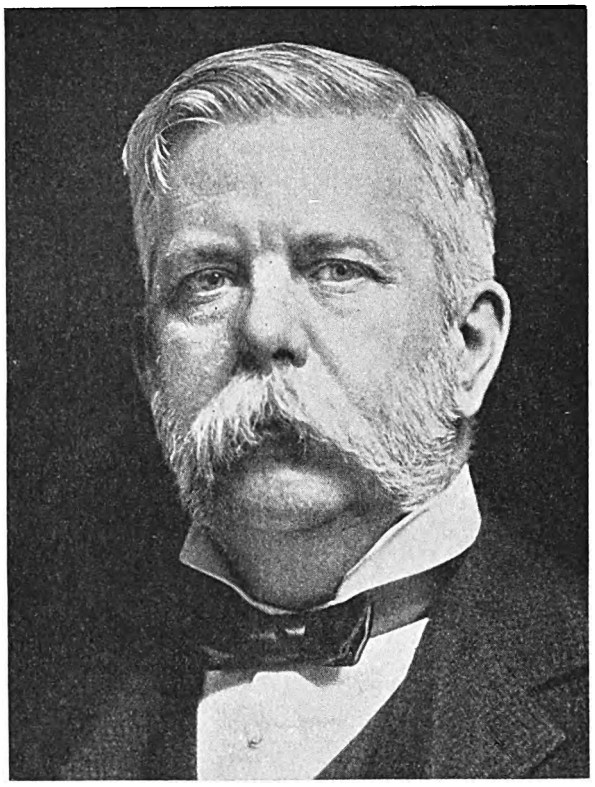
Number of HR-2 units	50
Type of unit	Double-deck, two-man, motor, passenger, city, double end, double truck
Number of seats	74; 46 up, 28 down
Builder of car body	English Electric Co., Ltd., Preston
Date of delivery	1930
Bolster centers	11 ft. 0 in.
Length over-all	33 ft. 10 in.
Length over body posts	22 ft. 2 in.
Truck wheelbase	4 ft. 9 in.
Width over-all	7 ft. 1 in.
Height, rail to trolley base	15 ft. 7 in.
Body	Semi-steel
Roof	Arch
Doors	End
Brakes	Magnetic
Armature bearings	Roller
Axles	4½ in.
Car signal system	Atmospheric air type
Control	Metropolitan-Vickers Co.
Destination signs	Illuminated curtain
Floor covering	Battleship linoleum
Gears and pinions	Helical
Glass	Non-shatterable in exposed parts
Headlining	⅜-in. Tucker plywood
Interior trim	Honduras mahogany below; light and antique oak above
Journal bearings	Roller
Journal boxes	SKF
Lamp fixtures	Silvalux 10 in lower, 10 in upper deck
Magnetic brakes	Estler Bros., Ltd.
Motors	Four Metropolitan-Vickers No. MV-109, inside hung (30 hp.) two in series on 525 volts
Painting scheme	Vermilion and cream
Roof material	Aluminum alloy sheets
Sash fixtures	"Windsor"
Seats	G. D. Peters & Co.
Seating material	Moquette below; leather cloth above
Steps	Stationary
Trucks	Electro-Mechanical Brake Co., Ltd.
Ventilators	4 Ashanco and Venturi air-extracting units
Wheels, type	Steel, diameter 26½ in.
Wheelguards	Hurst, Nelson & Co., Ltd.

Digitized by Google

Memorial to

George Westinghouse

Citizen, Inventor and Benefactor of Humanity



George Westinghouse

IN A WOODED GLEN in Schenley Park, Pittsburgh, and before a striking bronze group which is an outstanding contribution to modern art, leaders in every activity of American life paid their respects on Oct. 6 to the memory of one of its most brilliant empire builders—George Westinghouse, inventive genius who produced some of the greatest safety devices of modern times, helped to make the electrical age possible and about these accomplishments built industries which today employ more than 70,000 people in the United States, Canada, Europe and the Orient.

The memorial consists of seven great panels and a statue. It represents the finest efforts in present-day sculpture and architecture. Daniel Chester French, foremost among modern sculptors, contributed the best of skill and genius to produce the figure of American Youth and the main panel. Henry W. Hornbostel, designer of the Harding Memorial, the Hellgate Bridge, and many prominent public buildings, arranged the beautiful setting of the Memorial. Paul Fjelde, a rising young Italian sculptor, produced powerful, striking bronze records of Westinghouse's six greatest mechanical achievements.

At the dedication more than 800 men and women were grouped at the entrance to the ravine in which the memorial was erected. Before them, bordered on both sides by the broad green of two weeping willow trees, was a lily pool. Beyond it, against a background of rocks and the first color of the fall foliage, was the memorial. There is a large central panel flanked by two semicircular wings, all in gold-leafed bronze, with base and insets of black Norwegian granite. In a medallion on the central panel George Westinghouse leans over his drawing board. On either side stand life-size figures in full relief—a skilled mechanic and an engineer with his slide rule. Each of the flanking wings bears three panels depicting in low relief the major events in the career of Mr. Westinghouse. Then, before the monument, placed well back from the panels, stands a bold figure of American Youth, the work of Mr. French. Just a boy it is, in knickers and sweater, his schoolbooks under his arm, who gazes with eager, reverent interest upon this inspiring testimonial to creative genius.

The host of distinguished guests, leaders in the electrical and railway industries, the financial and business world, massed about the speakers' platform made a vivid scene. It was impressive because this throng had come together to honor not only a great man but the ideals and qualities of greatness which that man personified. Through the characteristics of his life and work, therefore, this shrine of George Westinghouse becomes "a monument to the dignity of labor and the supreme glory of service." It is a symbol of the faith, courage and spirit of man that have built the industrial empire.

Incidents in the story of the life of George Westinghouse were reviewed by eloquent speakers in the program of dedication and at the banquet of 700 guests of the Westinghouse organization which assembled at the William Penn Hotel in the evening.

As one of the commentators of the unveiling said, it is impossible to measure George Westinghouse in terms that apply to ordinary men. He patented more than 400 inventions, but he was not primarily an inventor. He founded scores of successful companies, but he was in no sense a promoter. He made millions for himself and others, but he cared nothing for money for its own sake. He directed many vast engineering undertakings, but he cannot be considered merely an engineer. He was one of the most impressive figures, one of the most dynamic forces of his generation, and he applied his gifts and his ability for the benefit of humanity. He contributed greatly to the material development of his country and the world at large and, because of the universality of his work and genius, belongs not only to America, but to the world.

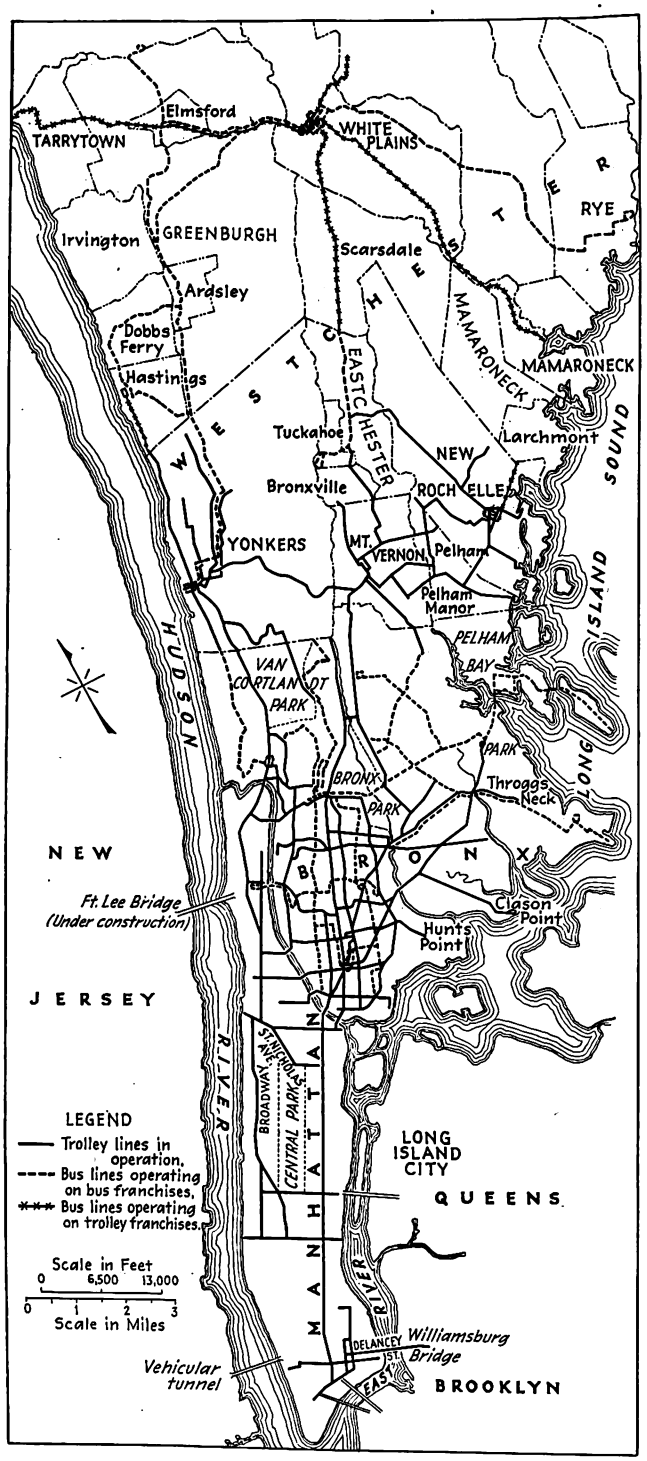
The memorial in Schenley Park is an expression of the pride and veneration of the many thousand Westinghouse employees who contributed to a fund to do honor to this great man. And the occasion in itself was a recognition and a tribute such as have seldom been given in the history of industrial progress.

Digitized by Google

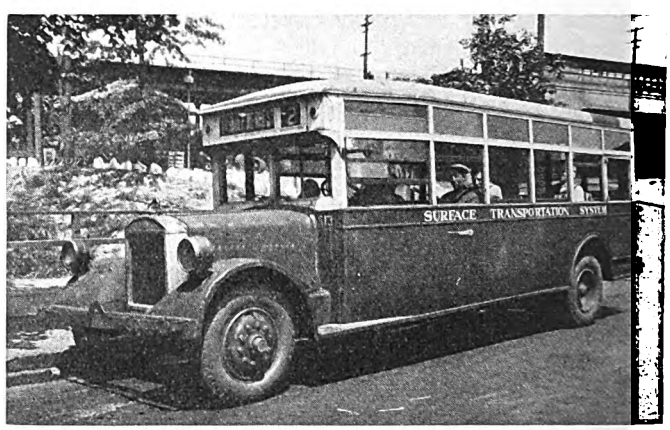
Co-ordinated Bus Operation

INCREASES

Supplementary and feeder service in the Borough of the Bronx and partial replacement service in Westchester County have gained new riders. At the same time street car gross revenue has increased



Bus operations of the Third Avenue Railway System are divided into two distinct units. Twelve routes in the Bronx are effectively co-ordinated with street car service in that borough. In Westchester County general substitution of buses for cars has been made. Further expansion of bus operations in southern Westchester County is under consideration.



A 23-passenger bus used for shuttle service

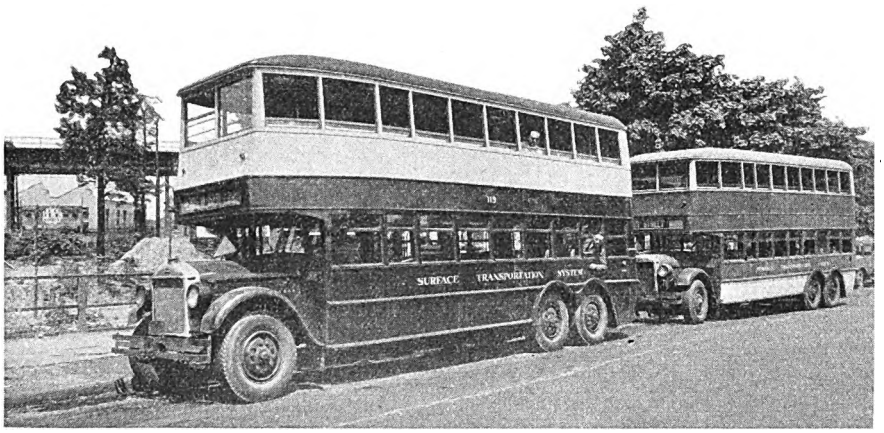
INDICATIVE of the value of properly co-ordinated street car and bus services is the experience of the Third Avenue Railway System, New York City. In the Borough of the Bronx, this company through its subsidiary, the Surface Transportation Corporation, in operating twelve extension and feeder bus routes covering approximately 60 miles. In Westchester County, the system includes two local and seven inter-urban routes, ranging in one-way mileage from 1.34 to 12, the total being slightly more than 58 miles. In this latter group five lines have replaced previous street car operations. Notwithstanding the fact that the bus systems have been installed in territories already well served by the street car lines of the Third Avenue Railway and the fact that receipts from bus operations now amount to approximately $6,000 a day, gross revenue from street car operations in both the Bronx and Westchester County have shown substantial increases.

For the system as a whole, due to traffic losses in Manhattan, the street car revenue for the year ending June 30, 1930, was 3.3 per cent below the preceding year.

Digitized by Google

REVENUES *of Third Avenue Railway*

in New York City



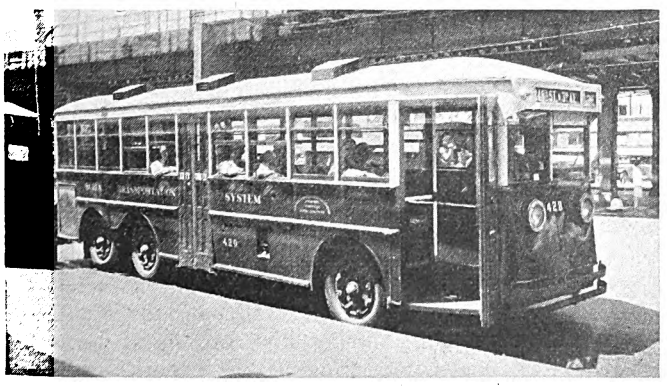
Double-deck buses seating 56 passengers are used on the two Concourse routes

Bus revenue for the system as a whole increased 11.2 per cent. The increase in net revenue from bus operations more than offset the decrease in net from rail operations.

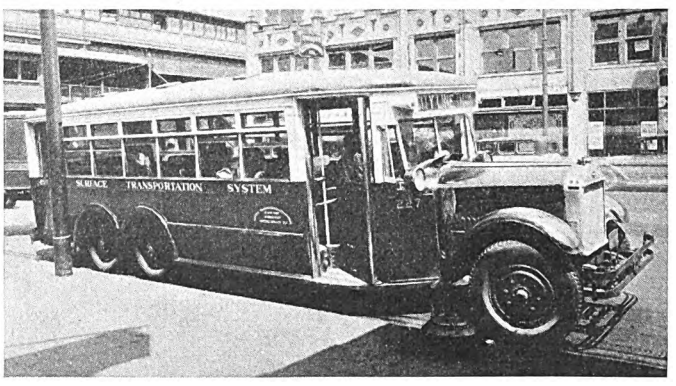
Franchises covering the twelve routes in the Bronx were obtained from the City of New York under date of Aug. 4, 1927. The term of the original grant is for five years, with the right to renew for an additional five years resting with the company. The basis on which the franchises were secured was the 5-cent fare, although two routes were permitted two zones of 5 cents each, and two more routes were permitted three zones of 5 cents each. Two lines were put into operation during the latter part of 1927 and the system was completed during the following year. With these services in effect in the Bronx, the threatened invasion of the Third Avenue Railway Company's territory by independent bus operations disappeared.

Previous to 1927 the bus operations of the Third Avenue Railway were confined to scattered lines in Westchester County. Here again, independent bus operations threatened local and interurban street car lines. Therefore, under its subsidiaries operating in this territory, the company turned its efforts to the securing of a unified and co-ordinated bus system which would adequately serve the twenty municipalities in this area and protect the investment previously made.

After a long process of education both of the company and the communities served, fair and reasonable conditions of operation were obtained. Franchise agreements with these various municipalities and the agreements for the substitution of buses, where desirable, have now been concluded. For the most part, buses in Westchester County are operating on street car franchises by consent to substitute buses for cars. The street car franchises have in most cases about 70 years



A Versare gas-electric bus in service in the Bronx system



Safeway, six-wheel vehicle used by the Third Avenue Railway System

Digitized by Google

Statistics on Third Avenue Railway Bus Operations

Route No.	System Companies	One-Way Mileage	No. Buses Mid-day	No. Buses Rush	Type of Bus	Headway Mid-day	Headway Rush	Speed M.P.H.	Stops per Mile	No. Zones	Fare per Zone, Cents	Year Started	Replaced Trolley	Pass. Carried Month July, 1930 Fare	Pass. Carried Month July, 1930 Trans.
	Surface Transportation Corporation														
1	Concourse—138th Street	5.01	8	12	56 pass., d'ble deck	10	5-6	7.57	10	2	5	1928	No	486,380	19,616
2	Concourse—Hub	6.12	8	10	56 pass., d'ble deck	10	8	7.72	10	2	5	1928	No	353,367	24,944
3	Prospect Avenue	5.85	12	16	37 pass., gas-elec.	6-7	5	7.40	10	....	5	1928	No	466,246	40,611
4	Jerome Bainbridge	4.10	8	16	29 pass.	7-8	3-4	7.94	8	....	5	1928	No	376,815	12,149
5	City Island—West Farms	8.00	4	4	29 pass.	20	20	10.17	8	3	5	1928	No	214,572	6,256
6	Throggs Neck	4.80	6	14	29 pass.	8	3-2	9.09	8	....	5	1928	No	327,692	4,271
7	Boston Road	2.60	1	1	23 pass.	30	30	9.85	8	....	5	1928	No	19,861	730
8	Williamsbridge Road	2.60	1	1	23 pass.	30	30	9.63	7	....	5	1927	No	19,071	4,217
9	Eastchester Road	3.70	2	4	23 pass.	25	18	9.68	7	....	5	1927	No	82,873	11,842
10	Riverdale Avenue	3.55	2	4	23 pass.	20	10	9.35	7	....	5	1928	No	71,130	0
11	170th Street Crosstown	3.50	8	12	37 pass., gas elec.	8	5-6	6.40	10	....	5	1928	No	458,512	49,216
12	City Island—Fordham	8.35	5	10	29 pass.	10	7-8	9.39	8	3	5	1928	No	355,241	27,003
	North Street Transportation Corporation														
17	White Plains-Yonkers	12.00	2	2	29 pass.	60	60	11.59	3	8	10	1925	No	22,208	0
18	White Plains-Harrison-Rye Beach	8.50	2	2	29 or 41 pass.	60	60	9.16	3	4	10	1925	No	29,991	0
	Westchester Motor Transfer Co. Inc.														
29	White Plains-Hastings	10.50	3	4	29 pass.	60-20	60-10	11.46	6	5	10	1927	No	26,521	600
30	White Plains-Grasslands	6.00	1	1	29 pass.	60	60	12.32	6	3	10	1927	No	16,621	0
	Westchester Street Transportation Co., Inc. and Eastchester Transportation Corp.														
22	White Plains-Tuckahoe	7.52	4	8	29 pass.	20	10	9.81	6	3	10, 15, 25	1926	Yes	79,525	0
21	White Plains-Mamaroneck	4.10	3	3	29 pass.	20	20	12.27	5	3	10, 15, 25	1927	Yes	28,033	0
23	Silver Lake	1.85	1	2	29 pass.	30	30	7.08	10	1	10	1927	Yes	25,321	0
25	White Plains-Tarrytown	6.40	4	6	41 pass.	20	10	9.17	10	4	10, 15, 20 25	1929	Yes	87,052	0
	Hastings Railway Company														
	Warburton Avenue	1.34	2	2	29 pass.	10	10	8.02	4	1	10	1929	Yes	24,207	0

to run. The consent for the substitution of buses provides for a minimum fare of 10 cents, with the right to reinstall tracks and car operations after ten years if such reinstallation seems desirable. This factor of the franchises is believed to warrant the sacrifices and expenditures necessary to develop a more extensive system. In fact, further substitution of buses for cars is under consideration in the southern part of Westchester County, in Mount Vernon, New Rochelle and the Pelhams.

On all lines the Third Avenue Railway System operates 177 buses, of which 133 are used in the Bronx and 44 in Westchester. New vehicles, consisting of Safeway six-wheel, A.C.F. and Versare gas-electric buses, were purchased for use on these systems, ranging in seating capacity from 56 to 23 passengers. On the two Concourse routes in the Bronx, 27 double-deck buses are used. In Westchester, six 41-passenger vehicles are operated on the White Plains-Tarrytown route, the remainder seating 29 passengers. The smaller, 23-passenger, buses are used generally in shuttle service in the Bronx. When these buses were purchased, the company financed 80 per cent of the cost with 5 per cent equipment certificates sold at par, which are being retired serially over a period of five years.

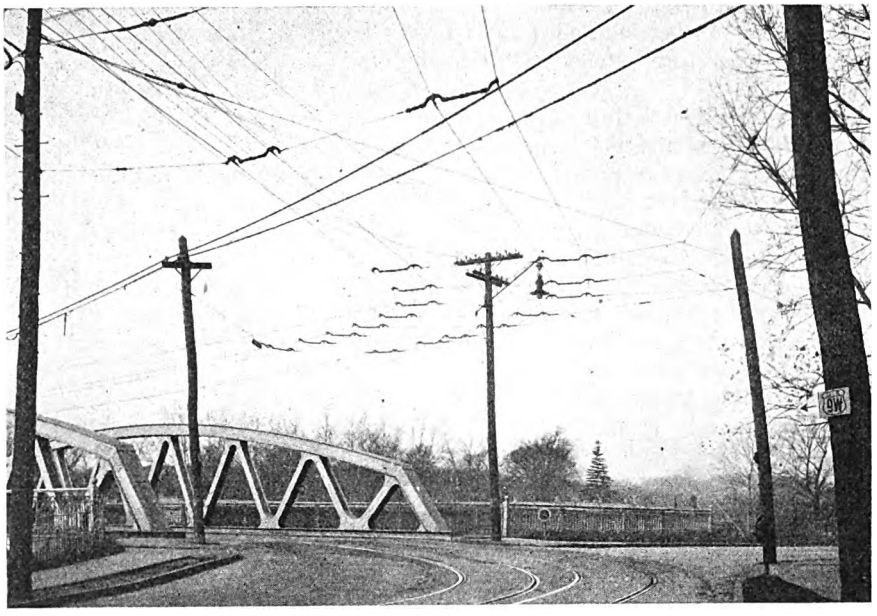
Garage facilities are centrally located for both the Bronx and Westchester systems. It was necessary to purchase land and construct a garage in White Plains for Westchester County. It is located within two blocks of Main Street, and on the Harlem division of the New York Central Railroad, with a siding on the property from which oil and gasoline can be delivered in tank car lots. In the Bronx, the company secured a central location, owned by a contractor, who built a modern garage to meet the railway's requirements on rental terms, which were very advantageous, as well as saving the outlay of a large amount of money. A building belonging to the Union Railway, a subsidiary, located on West Farms Road and 172nd Street, formerly a power plant, was reconstructed so as to make it particularly well adapted to the purposes of a general shop for the rebuilding of buses. Subsequent additions to this building house a machine shop, paint shop and storeroom. Buses from both systems are brought to this plant for general overhaul and repair.

Equipment Inspections and Overhaul

Maintenance practices include three schedule inspections and an overhaul. All are on a mileage basis as follows: At a minimum of 1,000 miles, buses are held in on a greasing inspection; at 2,000 miles the bus is given a general inspection, and at 20,000 miles a general engine inspection is made. At the end of approximately 1,000 miles buses are thoroughly inspected for grease, and lubricating materials are renewed. Heavy greases are used only in universal joints and wheel bearings. A 600-W type lubricant is used in the rear end and transmission, as well as in the grease cups. At the general, or 2,000-mile, inspection the body, engine, electrical equipment, treadle doors, seats and floors are thoroughly inspected. At the 20,000, or engine, inspection oil pans and cylinder heads are pulled, main and connecting rod bearings, pistons, rings and cylinder walls are checked and replacements are made if necessary. The general overhaul or repair is based on the condition of the bus at the various inspection periods. This averages approximately every 50,000 miles.

Bus operation and bus maintenance supervision are combined under one executive of the Third Avenue Railway System. A general superintendent heads both departments. This practice has been especially successful in co-ordinating operating and maintenance practices as well as instruction and discipline in both phases. Road supervisors and inspectors are schooled in both operating and maintenance methods and they, therefore, watch the effect of individual operation on the mechanical equipment. An example of the effect of this co-ordination is reflected in the greater tire mileages obtained over a short period. They have been increased from 12,000 to 19,000 miles. If an operator of a bus has abused equipment during his run, he is brought before a trial board consisting of the general superintendent, operating and maintenance officials, and given either instruction or discipline for his violation.

Digitized by Google



Curve construction for trolley bus showing one method of support

Successful Trolley Bus Operation Demands Suitable Overhead

The writer discusses the requirements of the service, which differ materially from street car work. The principles on which design of contact line and collectors is based are discussed

By

G. W. BOWER

Transportation Engineering Department
General Electric Company, Erie, Pa.

VARIOUS types of overhead contact and collector systems have been tried in the many years trolley buses have been in use. Probably the three systems that have been employed most widely are the over-running contact. the sliding contact, and the trolley-wheel.

With the over-running contact system the two contact wires, positive and negative, are so insulated and supported that a small carriage with grooved wheel can be towed along over the wires by a flexible cable which completes the electrical circuit between the trolley bus and the contact wire. This system has been used abroad to a limited extent, but in this country only for trial runs which were not successful.

Its chief advantage is that the touring range of the bus is limited only by the length of flexible cable that can be handled properly, and not by a pole of fixed length. Another supposed advantage is that two trolley buses can pass each other by an exchange of collectors.

Its disadvantages are the expense of constructing and maintaining a suitable overhead line and a collector carriage and the complication where routes cross each other or branch off. Also, it is unsuitable to combine with overhead systems used by a street railway.

In the sliding contact system, positive and negative contact wires are so insulated and supported that a collector consisting of two long shoes with horns, both flexibly mounted on a single pole supported by a trolley base, can slide beneath the wires. The collector is very simple and has no rotating parts. and the contact wires can be placed close enough together to be supported and insulated by a combined unit.

A disadvantage of this system is that complicated, special devices must be used in the overhead line where routes cross or branch off. The system does not readily lend itself to joint usage with existing street car systems.

The trolley wheel contact system has two contact wires and two separate trolley bases and poles, fitted with insulated swivel pole heads. The arrangement lends itself to joint usage with existing street railway overhead lines better than either of the previous types. Also much existing street railway standard line material may be used. Accordingly this system has, in this country, superseded all others.

Special Trolley Wheel Collectors Employed

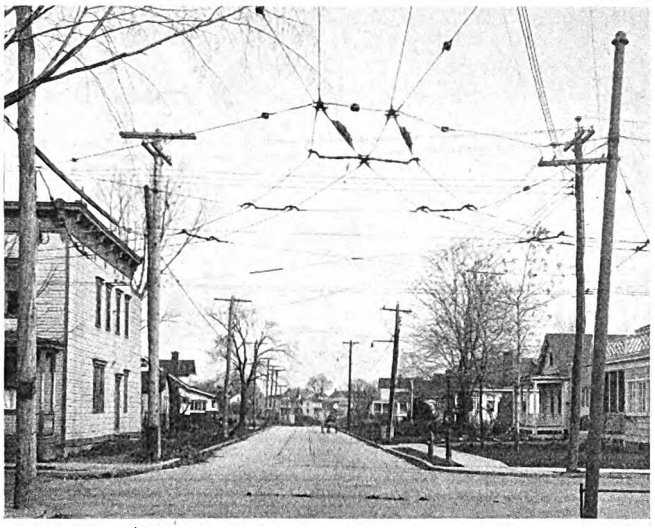
The limitations of the wheel collector should be known so that a large amount of standard street railway line material may be used. This, if properly installed, will prove very successful. There is nothing in the design of the collector that has not been used before, especially on street railways abroad where the trolley wire is located

Digitized by Google

alongside the right-of-way. The main changes are lengthening of the pole, adopting efficient bearings, and selecting operating angles to meet detouring requirements.

The latest installations use collectors with an 18-ft. pole. The base and pole head are so designed that the wheel will operate normally between the limits of 7 and 10 ft. above the bottom of the base. The limit of detouring range from under the contact wire within the above limits of height, on tangent overhead at normal speed should not exceed 10 to 12 ft. It is advisable to reduce speed when detouring to any great extent from under the contact wire on curves or under special overhead fittings.

The most recent collector bases and pole heads have roller bearings so as to respond readily to all the variations in the overhead system and the movements of the



Branch-off for trolley bus service. Insulators keep the two lines separate

bus on the street, and thereby keep a uniform wheel pressure against the wires. However, with the necessary weight of the 18-ft. pole and swivel pole head, this cannot be done if abrupt changes occur in the overhead system. Alignment of contact wire is, then, very important.

The pole head design is such that a line passing through the axis of the swivel bearing intersects at right angles the center line of the wheel bearing. The angle between the axis of the swivel bearing in the pole head and the center line of the pole is fixed, so there is only one position of the pole at which the axis of the swivel bearing will be perpendicular to the center line of the contact wire. This may be called the design position of the pole. If the pole is higher than the design position when the bus is directly under the contact wire, the swivel bearing gives the harp a slight leading caster effect, which is unstable. If the pole is lower than the design position when the bus is directly under the overhead, the swivel bearing gives the harp a slight trailing caster effect, which favors stability of the harp. If the bus diverges from under the overhead and the pole is above the design position, the harp and wheel are tipped in the direction to hook around the contact wire, which tends to prevent dewirements. If, however, the pole is below the design position and the bus diverges, the harp and wheel are tipped, tending to unhook the wheel groove from the contact wire.

Contact-wire height is very important in connection with the operation of a swivel-head collector. At points where the bus is likely to detour from under the contact wire, such as at designated curb stops, the wire height should be such as to maintain the pole at the middle point of its operating range. Care should also be taken in building and maintaining the overhead system to have the sides of the contact wire ears and splicing sleeves as nearly vertical as practicable to minimize the liability of the wheel flange fouling with the ear boss when the bus is detouring and the trolley wheel happens to be tilted.

The collector pole head was designed to permit the wheel to follow the varying positions of the contact wire with the least possible resistance and to give a certain amount of stability in backing. The only means by which the necessary force is obtained for moving the pole head under the wire is through the trolley pole, which is never in direct alignment but is always pulling the wheel along at some angle to its direction of travel. When the trolley bus detours from under the contact wire, the wheel and pole head must travel faster than the bus because of the increasing angularity between the pole and the contact wires. This calls for an additional force on the side of the wheel. It is, therefore, essential to reduce as far as possible the horizontal angularity of the pole to the contact wire, which becomes maximum because of side displacement of the wire when the collector approaches a support. This side displacement, which is caused by the side pull of the collector, will be reduced if a high tension is maintained in the contact wires.

The swivel-type harp is at certain speeds subject to "shimmying" as are the front wheels of an automobile when out of adjustment. Just as a rough road aggravates the shimmying of automobile wheels, a rough overhead may start the trolley wheel shimmying. With round wire, care should be used when installing the ears to see that they are well formed around the wire and also that the splicing sleeves are installed with their sides vertical so as not to aggrevate this tendency when the wheel passes such obstructions.

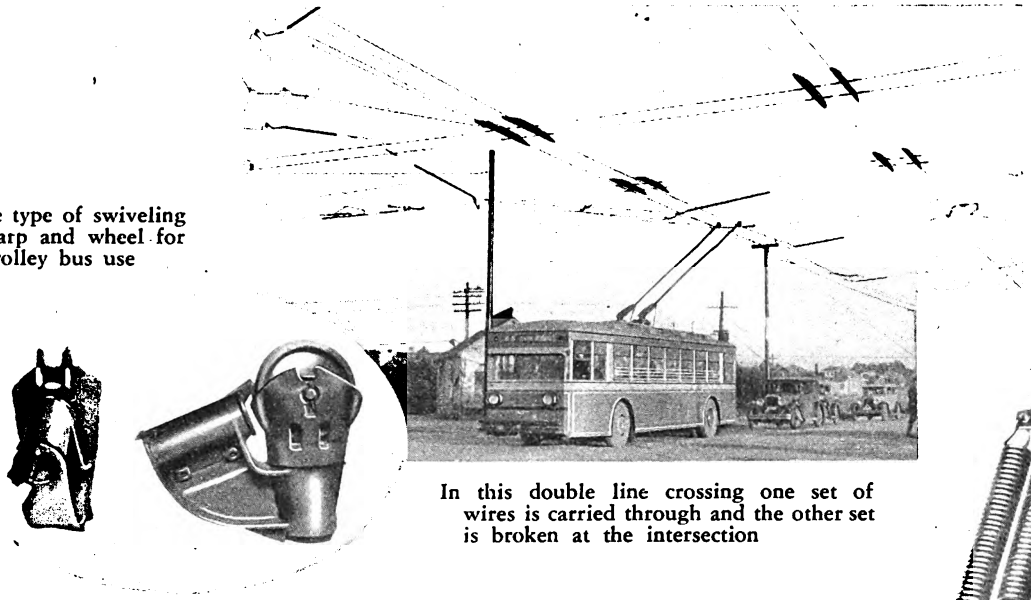
Both Single and Double Lines Used

In general, the overhead construction for trolley buses may be classified as a single line or a double line. A single line has two wires, positive and negative, corresponding to a single track street railway. Buses may or may not operate in both directions under it. A double line has four wires, corresponding to a double-track street railway.

Some portion or all of either the single or double lines may make joint use of the positive trolley wire of an existing street railway. When trolley buses and street cars make joint use of the same positive contact wire, such use prevents the detouring of the bus around a street car without the removal of the street car collector. The location of the street car overhead positive wire may be such that the bus touring radius is not sufficient to reach the curb. It also may be undesirable to make joint use of the street car overhead positive trolley wire on account of complications involved in the overhead construction, as sometimes a large number of special fittings are required. For a successful solution of each case a detailed study must be given to the various problems involved.

In erecting an overhead contact system for trolley-bus operation the methods used are the same as for direct suspension construction for street railways, with contact

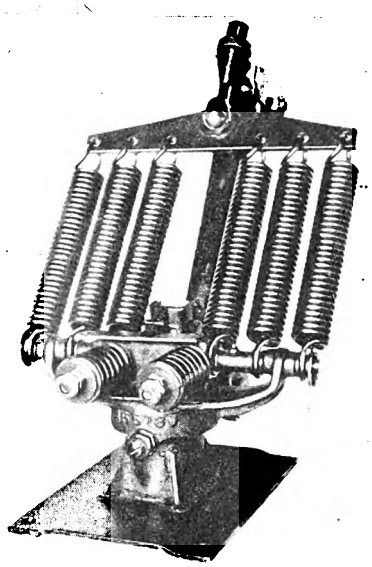
Digitized by Google



One type of swiveling harp and wheel for trolley bus use

In this double line crossing one set of wires is carried through and the other set is broken at the intersection

Swiveling trolley bases of this type are widely used on trolley buses



wires suspended at spans or brackets only. The pole spacing should not exceed 100 ft. and preferably should be less where special overhead fittings occur.

With cross span construction a second cross span across the street from pole to pole may be necessary to keep the contact wires supporting ears in a vertical position, if the cross span wire is heavily loaded with other wires and special overhead devices. The upper span is then given all the sag and carries the complete load. The lower cross span is largely used for holding the suspensions and special devices in proper position.

Contact Wire Location Depends on Service

If the service demands only a single line with bus traffic in both directions, the contact wires should be placed over the middle of the street. If the street is wider than 30 ft. it will be necessary, with the present design of collector, to displace the contact wires to the side of the street at points where scheduled curb stops are to be made.

So that the bus operator need not remove his collector from the contact wires when passing another bus moving in the opposite direction at scheduled meeting points, overhead turnouts may be installed. Since the collectors are the only parts that take the turnout, its length may be much shorter than for street car track turnouts. For a trolley bus overhead turnout, special frogs and crossings are required. The frogs should be of the one-way operating type so that a bus moving in either direction will always keep its respective contact wires at passing points.

If the service demands double overhead the center line of each pair of wires should be approximately 12 ft. from the curb line. When the contact wires are so located, the bus can pass parked vehicles at the curb and also can make curb stops without going beyond the operating range.

For either single or double overhead, a loop for turning the buses is desirable, although they may be turned on a wye in the overhead system where space will not permit construction of a loop. The wye requires special frogs and crossings, which call for more maintenance than standard fittings used on loops. Where wyes are used, the trolley wires should be installed at normal height and good tension maintained.

When positive and negative feeders are required, it is best for safety reasons to keep the negative feeder on the opposite pole line from the positive. The negative feeder is always insulated the same as the positive. Taps from the feeder to the contact wires should be carried by a cross span located above the supporting span, with the taps dropped down to the feeder ears attached to the contact wires. A feeder ear with a suspension boss should be used. It is best for insulation and for safety to make the negative and positive feeder taps at adjacent spans rather than at the same span.

Generally speaking, the principles used for sectionalizing street railway lines apply to trolley bus lines. It may be desirable to install section insulators, normally shunted, in the negative trolley wire, permitting disconnection of the negative wire for the safety of linemen in working on certain sections.

Practically all existing trolley bus installations in this country make use of standard street railway suspensions with either a porcelain or wood strain insulator between the positive and negative contact wires. Since the trolley bus collector consists of two separate units which for mechanical and electrical clearance require approximately 24 in. between centers, the contact wires are spaced the same distance on tangents and in some instances slightly greater on curves. Later installations use the same spacing for both tangent and curves.

The nominal spacing of 24 in. for the trolley wires is too great for an economical combined unit with two insulated suspensions and double insulation. The practice of installing a strain insulator in the span between the insulated hangers no doubt had its origin in a similar practice of reinforcing suspension insulation on regular street railway work. It seems quite probable that on new work satisfactory insulation between positive and negative can be obtained at a lower cost by using a better quality of insulation than is regularly used in street railway suspensions. On account of the possibility, however, of the cross span wire becoming energized because of a dewired wheel, a strain insulator should be placed in the cross span next to the pole.

Digitized by Google

On curved sections straight-line suspensions should be avoided when tilting of the ears cannot be prevented. The number of curve suspensions should be such that at no pull-off point will the deflection angle be more than 12 deg. All contact wire ears should be formed at such points to correspond to the arc of the curve. No curve in the overhead should have a smaller radius than the turning radius of the bus.

On account of the angularity which a swivel harp gives the wheel when proper trolley wire heights are not maintained, it is very important that all devices in the overhead system give the maximum wheel clearance possible. Existing trolley bus overhead systems as a rule use round wire and clinch ears of various lengths. Of late years, in order to obtain long life, the lip thickness has been increased. Special care should be taken when installing them to peen the lips close to the wire. Grooved contact wire with clinch ears gives far better clearance and eliminates many of the ear troubles experienced with round wire. It should be given consideration.

In selecting splicing sleeves for trolley-bus service, wheel clearance is the most essential point. It is best to use a sleeve with a small height so as to reduce the turning tendency as much as possible.

Special Frogs Are Required

Since the wheel of a trolley bus collector is free to turn about its swivel bearing, it must at all times be guided in the direction in which it should travel. For this reason standard street railway contact wire frogs should be used only when the travel is from the double end to the single end. In order for the wheel to pass through a frog in the other direction, the path for the wheel tread must be continuous. This is accomplished by having frogs with a movable tongue for the tread of the wheel to follow, of which there are three types, operated by spring, mechanically, and electro-magnetically.

The spring type frog is similar to any standard street railway overhead frog except that it has a tongue which completes the path for the trolley wheel tread from one end to the other. This is so hinged that, when a wheel passes on the runway not connected with the movable tongue, its flange may crowd the tongue to the side and allow the wheel to pass through. When a wheel passes in the opposite direction, it always follows the runways connected with the movable tongue. In earlier designs the movable tongue consisted of a flat spring, but as it deteriorated rapidly later designs have a hinged tongue held in position by a coil spring.

The spring frog is used where the bus operator need not select the route, as at the junction point of a loop and a single line overhead system, junction points in a wye and on single-line turnouts.

The mechanical type frog has a movable tongue connected by an insulated rod to a treadle in the other trolley wire. When the trolley wheel passes the treadle, it operates the movable tongue in the frog for guiding the wheel passing through it in the same direction as the trolley wire with the treadle. The mechanical frog is used only where the trolley bus overhead branches off from a street car system.

The electro-magnetic frog has two solenoids to move the tongue. For its operation special devices must be installed in the overhead adjacent to the frogs that will under certain conditions allow current to pass through the proper solenoid to move the tongue. The electro-magnetic frog is used where route selection to be made by the bus operator, as where lines branch off.

Pennsylvania Railroad

First unit in expansion program placed in service is suburban terminal in heart of the city and a connecting underground line

RAPID progress is being made in the reconstruction of the Pennsylvania Railroad's tracks and terminals in Philadelphia, which forms an integral part of the major electrification project which is being carried out by the railroad. The principal changes in the Philadelphia district are centered in the construction of a new passenger station for through and suburban trains at 30th and Arch Streets, a new underground suburban terminal at Sixteenth Street and Pennsylvania Boulevard (formerly Filbert Street), and the abandonment of the steam terminal at Broad and Market Streets and the West Philadelphia station at 32nd and Market Streets.

Progress in the work is being watched with interest, since it involves maintaining a very heavy train service through the territory while the new construction is going on. The transfer of train service from the old to the new facilities is being carried out in a series of steps planned to produce as little interference as possible. It is expected that the improvements will be in full use late in 1933.

The first unit in the plan, the suburban terminal, the connecting tracks and the portion of the 30th Street station reserved for suburban trains, was put in service on Sept. 28. Temporarily, a few suburban train movements are being made into the old Broad Street station, and steam trains terminating in Philadelphia are being operated to and from there. Ultimately, all of the 325 daily suburban electric trains will use the new stations. As soon as the construction of the through terminal at 30th Street has progressed far enough, movements to the old Broad Street Station will cease and the viaduct adjacent to Market Street will be torn down. The land will be used in part for widening Pennsylvania Boulevard and in part for construction of office buildings facing on Market Street.

The main terminal station at 30th Street will have two track levels, the lower one for through trains hauled by locomotives and the upper one for suburban trains of multiple-unit cars, with a passenger concourse on the level between the two. The sixteen tracks for the through trains on the lower level will run north and south, in general paralleling the Schuylkill River. Facilities will be provided so that through trains between New York and the West can enter and leave the station by means of loop tracks without reversing direction. Trains between New York and Washington will pass directly through the station. The six suburban tracks run east and west above the passenger concourse at the north end of the station. The arrangement will provide for transfer of passengers between the through trains and the suburban trains reaching the heart of Philadelphia.

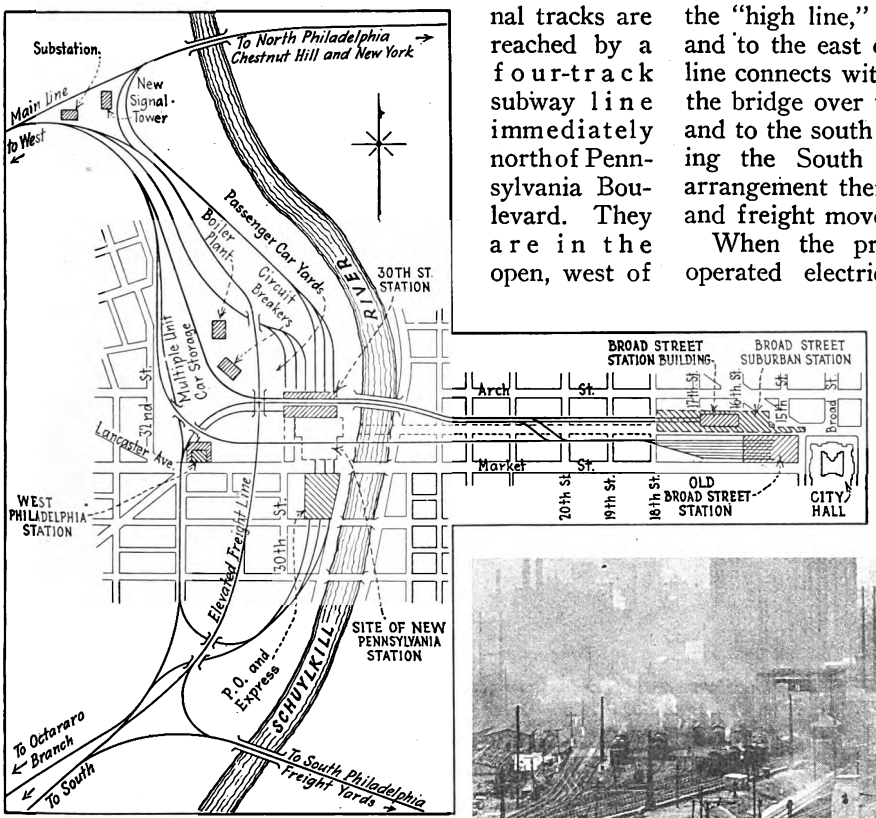
The Broad Street suburban terminal occupies a position immediately to the north and west of the present Broad Street station. It is 1,000 ft. long and 200 ft. wide. The passenger concourse is beneath the ground level, being reached by convenient stairways and passage-

Digitized by Google

Opens New Facilities in Philadelphia

ways connecting with the adjacent streets, the Broad Street station, the Broad Street subway station and the new Broad Street Station Building, which has been erected above the suburban terminal at the northwest corner of Sixteenth Street and Pennsylvania Boulevard, extending westward to Seventeenth Street. The tracks are immediately beneath the passenger concourse. At present, seven have been installed, and the number will be increased to twelve as the project develops.

The terminal tracks are reached by a four-track subway line immediately north of Pennsylvania Boulevard. They are in the open, west of



The principal improvements of the Pennsylvania Railroad electrification centering in Philadelphia include new through and suburban stations and removal of the masonry viaduct adjacent to Market Street

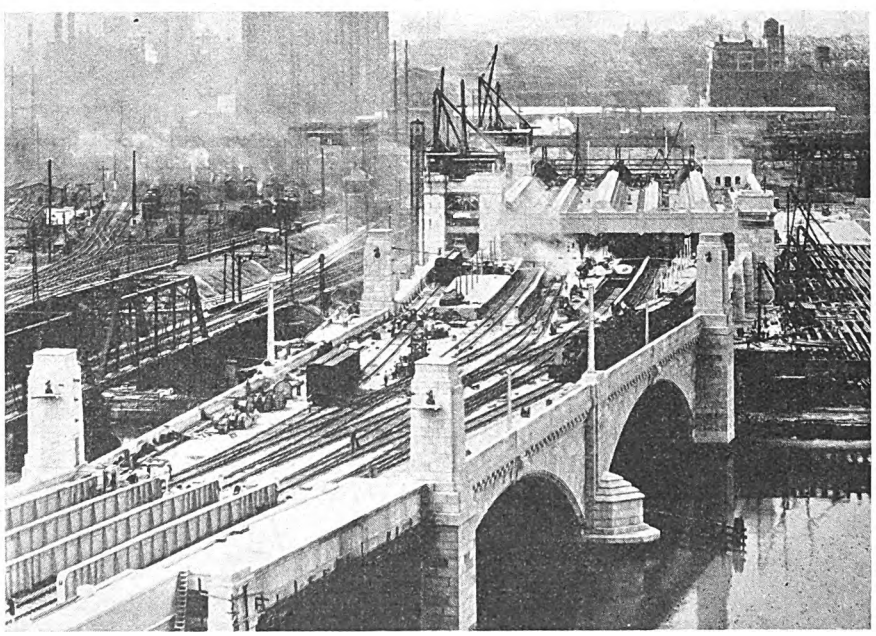
Twentieth Street, and, after climbing a grade, cross the Schuylkill River on a masonry bridge, immediately west of which is the 30th Street station.

A temporary connection has been made in the vicinity of 21st Street so that through trains can be operated over the new line into the Broad Street station. This will permit the present line between that point and the West Philadelphia station to be abandoned, so that construction of the lower level and the station building at 30th Street can be carried out. There will be sixteen tracks on the ground level when the project is completed, and the station building will extend south to Market Street. Immediately south of the station will be a new building for handling mail and express. To the north of the suburban line and west of the through tracks there will be a storage yard for passenger cars. This construction is now in progress. Storage space for multiple-unit suburban cars will be to the west near the present line between New York and the south.

All track connections are made through a system of elevated and depressed tracks, so that there are no grade crossings. This facilitates train movements and eliminates interlocking plants.

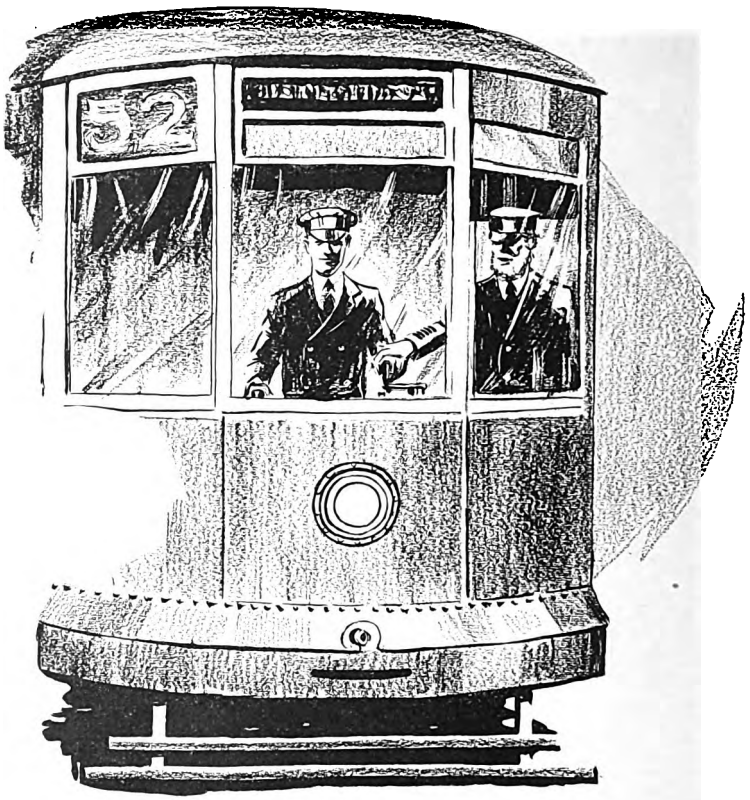
Freight movements through the district will continue to be made over an elevated structure, known locally as the "high line," located to the west of the new station and to the east of the West Philadelphia station. This line connects with the main line tracks in the vicinity of the bridge over the Schuylkill River in Fairmount Park and to the south near the connection with the line reaching the South Philadelphia freight yards. By this arrangement there is no interference between passenger and freight movements in the entire terminal area.

When the project is completed all trains will be operated electrically from the single-phase, 25-cycle trolley at a normal potential of 11,000 volts. Power for the electrification is received from the Philadelphia Electric Company at the Lamokin Street substation, Chester, and distributed at 132,000 volts, except for the terminal area and the line to Paoli, which are supplied by the older part of the system at 44,000 volts. Stepdown transformer stations, unattended and operated usually from adjacent signal towers, are located 5 to 10 miles apart. The trolley feeders in the vicinity of the new 30th Street station are controlled by high-speed, air-break circuit breakers located on a steel structure adjacent to the station. Alongside it is a boiler plant for supplying steam for heating the station and cars stored in the yard.



An airplane view of the new 30th Street suburban station and the Schuylkill River bridge. The elevated freight line is seen in the background

Digitized by Google



Many lax and inefficient methods of operation have been handed down by old men acting as instructors for recruits

Observations on Methods of Training Platform Men

By a

Veteran Electric Railway Official

Years of experience have proved that expert follow-up instruction of trainmen in the routine operation of their cars will result in worth-while economies. Co-operative remuneration based on savings in accidents and power costs encourages trainmen to improve their performance

IF YOU were to ask your superintendent of transportation who were the best operators your company had, he would almost certainly name those having the least number of accidents charged against their records. That would have been the way our superintendent would have answered you up to the time we began to look for economies in operation other than those shown in the amount spent on accident claims. These men were so classed because they were "very careful men." They were careful because they never took a chance, and as a result had excellent accident records. However, upon looking into other features of operation which were responsible for a large expenditure of money, it was found that these careful men were usually expensive operators in other ways involving the proper handling of the electrical apparatus on the car.

These men were often used as instructors for new recruits, with the result that many lax and inefficient methods of handling a car controller have been handed down from one man to another since the beginning of electric transportation. It is my belief that, although many companies have schools of instruction for beginners with large rooms filled with elaborate displays of various devices used on the cars, as well as diagrams of wiring, etc., the new recruit, whether having had this instruction or not, receives his strongest impression from observing how the man on the front platform performs his duty. I wish to emphasize the fact that better results will be obtained from practical instruction on the front platform in every-day service than from any other method now in use, provided the instructor is an expert in up-to-date operating ideas.

If worth-while economies of operation are to be effected, the first step to be taken must be the adoption of some plan to arouse the interest of the operators in their duties. If you are successful in interesting your men and holding them to their work with little effort, it will

Digitized by Google

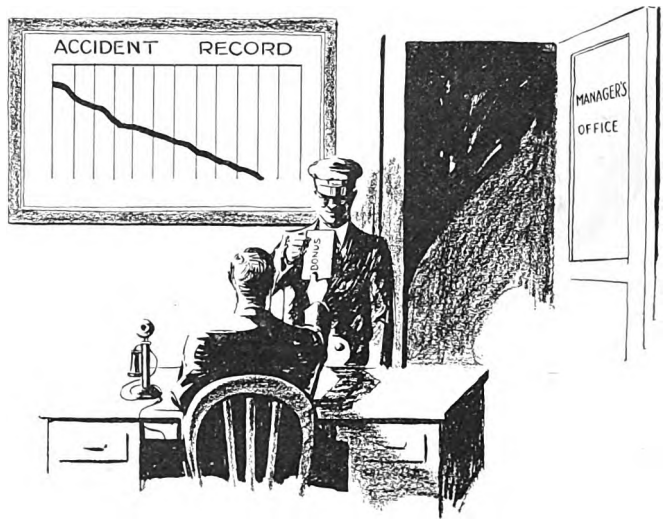
mean not only an improved quality of service, but will result in economies such as lower power consumption, lower maintenance costs of equipment and in a considerable reduction in claims for accidents. It is my belief that the means for arousing interest should not only be practical of application but profitable to the men as well as to the company. Bonuses based on attention to duty, efficient operation and safety have solved the problem on our property, and I feel sure can do so on many others.

Bonus Plan Arouses Interest In Accident Prevention

Payment of an accident bonus was one of the first steps we took in our program of the co-operative method of remuneration for platform men. About ten years ago we made an exhaustive survey of our claim department in endeavoring to reduce the number of accidents, which were entirely too numerous and costly. We found the department was doing everything possible in a legal, as well as persuave, manner to cut the cost of all claims. Officials were talking to the men from time to time in meetings. We had called upon the safety director of the city to assist by explaining what his department was doing to teach pupils in schools as well as the general public to practice safety at all times. This helped some, but it did not always last long. We had a safety banner which was held by the carhouse having the least number of accidents for a certain period, and this honor was keenly contested for throughout the property. We had an honor roll of men who had been free from accidents for a year, and at a banquet, held at the club room, a bronze medal was presented to each member of the roll by the general manager. All of the various schemes tried helped for a time and we spent a lot of money in an effort to cut out this cancerous growth which seemed to live upon that part of our resources intended for dividends. The money spent did not buy any shoes for the operators' children nor materially reduce the number of accidents.

Taking an average of the money paid out in claims for the previous five years, together with the money spent in putting on the foregoing safety campaign, we found it amounted to approximately $7,000 per year. This money all went outside of our organization to the benefit of people in whom we had no interest whatever. It occurred to me that it might be worth while to figure out some manner in which this money could be used to better advantage to the company than in the payment of claims. It was decided to offer the operators of our cars, all of which were one-man, 50 per cent of all money saved by the elimination of accidents. This would be paid in the form of a bonus of $30 for each man having not only a clean record on accidents for which he might be responsible, but from other violations of any nature such as failure to show up for his runs, discourtesy, missing fares and the like.

Payment of this bonus was to be made just prior to the Christmas season, and when the announcement putting it in force was made, great stress was made of the benefits to be derived from the receipt of this additional money at such an auspicious time. The men were enthusiastic over the proposition about like everything else we had tried in the past, so we were not at all alarmed over the fact that this bonus might amount to more than 50 per cent of all money saved by the elimination of accidents. But unlooked for results were obtained at once. This bonus has now been in operation for more than ten years, with the result that accidents of all kinds for which our men might be responsible have been eliminated to such an extent that the amount paid out in claims, together with the bonus, does not amount to



It is a good plan to divide with the operators the savings resulting from reduction in the number of accidents

any more than one-half the amount previously paid out for claims alone, and most of it goes to the operatives, where it belongs.

Another bonus was decided on to straighten out the kinks in our employment department. Any operator having a clear record for 30 days, no accidents or violations of any nature, was entitled to one day off the following month, with pay allowed. The day was to be of his own choosing and subject to such arrangements as the supervisor could make for a substitute to take his place. As a result of this bonus, minor violations passed into the discard to such an extent that we reduced our extra list to the absolute minimum. A large number of our men have been receiving not only a yearly bonus but each monthly one, which figures to approximately $90 per year for prize money, well spent and gratefully received.

As I have stated, to be efficient, an operator must not only be able to cut down losses from preventable accidents but those resulting from the excessive and wasteful use of power by improperly operating all electrical appliances installed on the modern electric car. Training to this end must begin with the recruit. Regardless of any school instruction, a new trainman must learn his operating practices and form his habits on the platform of a car under the guidance of someone with experience. I am a firm believer in expert platform instruction by competent men who do nothing else but supervise the actions and duties of the operators. These supervisors must not only be able to give them the theory of proper control of the car, but must be able to show the better way by demonstration under actual conditions. When I mention the proper handling of the controller I am referring not only to the speed with which the operator notches it, but to the fact that he too often runs on resistance points or throws the controller on and off too frequently, not being able to judge conditions and speed, and keeps power on for too long a time when approaching a stop, eliminating the amount of coasting to be obtained in any length of run with a resultant saving in power. Mechanical and electrical devices have been perfected to control the acceleration of motors, and

Digitized by Google

some companies have adopted these rather than find a way to assure proper performance by the man in charge of the car, but I prefer to have our men in entire charge of this feature and hold them absolutely responsible for the proper use of not only the controller but the brake valve as well.

Efforts To Save Power Should Include Auxiliary Uses As Well As Motors

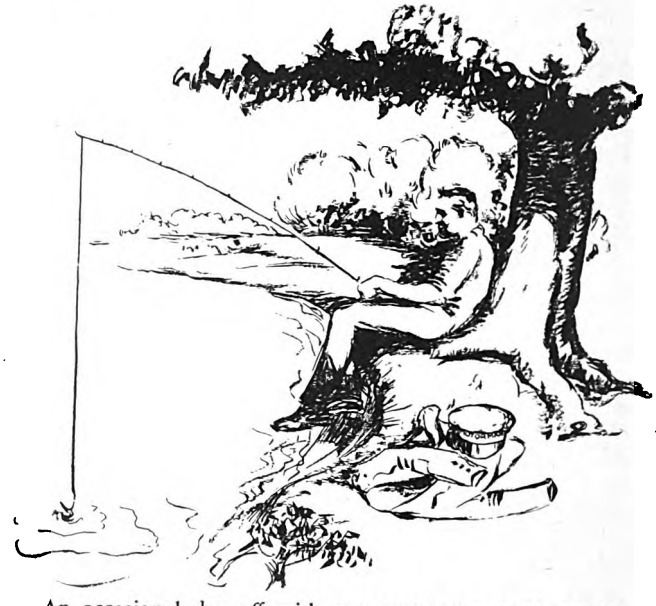
The use of power-saving meters was advocated a number of years ago to register the amount of current passing through the motors. They were used in an effort to cut down the amount of power consumed and to enable the mechanical department to inspect or overhaul equipment on a specified kilowatt-hour basis. The use of these meters is an excellent method of checking current consumption of motors, but that is only a part of the total amount consumed by the apparatus on a street car. When one considers the amount of work it is necessary for the air compressors to perform with the addition of air-operated door mechanism to the previously installed braking apparatus, it is time to give the matter considerable thought. In my opinion, the meter should be so connected that it will include the compressor and the lighting circuits as well as the motors, because there is a great waste of current in these two circuits in proportion to the waste in the motor circuit. If you want to economize, why not get all there is to save instead of only a portion? This would not necessarily destroy the feature of inspection measured by current consumption, as a new standard could be established for the various types of equipment. I am aware of one company which has had meters installed in the motor circuit only for approximately three years and has obtained a saving by their use of from 10 to 15 per cent. This is an attractive sum considering the amount of the power bill, but is not as much as could be obtained should the meters be connected to include the lighting and compressor circuits. There is no means of ascertaining the power losses incurred by improper operation of the brake valve unless meters are installed to cover all electrical units. I am confident that with an improved method of operating the controller and brake valve, additional savings in power of approximately 10 per cent in the motor circuit and from 5 to 7 per cent in the compressor and lighting circuits could be made on this property.

On our property we do not use meters except to check current consumption on our various types of cars under normal service conditions and for special tests we may wish to make. When we took up this matter of power saving we had a separate meter installed to register the amount of power used by the shops so as to give us a reasonable figure for car operation by subtracting the shop current from our total monthly bill. We figured out our monthly power consumption on a kilowatt-hour per car-mile basis for a typical month or two to obtain an average with which to compare. We also made a blind test on various runs to check with the average kilowatt-hours, obtained from the monthly bill and found them near enough to have something to shoot at.

To be even more certain of our figures, we made the test for saving on the same runs on corresponding days as for the blind test, and in each case the meter was connected so as to include the motor, compressor and lighting circuits. In view of the fact that it was not convenient to give sufficient training in our new method of operating the controller and brake valves before the tests were made, we were surprised to find that there was a difference of 25 per cent on one run and 22 per cent on two others.

Efficient Operation Depends Upon Personal Interest

Our power cost per year has averaged $130,000 for the past two years. It can readily be seen that the amount we have been paying to the power company should have been used to better advantage. It is a lot of money and one wonders why not only our company but many others have allowed it to be so carelessly expended. We all believe we are giving the proper and necessary training to our employees to obtain the minimum amount of current consumption necessary for correct and efficient operation, but we are not. I take the stand that regardless of the kind of training the operator of an electric car receives, his efficient application of the knowledge obtained depends upon the personal interest he takes in his work.



An occasional day off with pay encourages operators to keep their records clear of accidents or violations

This has been demonstrated to us by the use of the two bonuses mentioned previously. If there are any hopes of saving power either by the use of meters or automatic devices or methods dependent upon the human element for correct handling of the apparatus, it will be necessary to interest the man responsible. Let us take an average of $25,000 which has been going to the power company for several years and see how it could be advantageously distributed. We could afford to give 50 per cent of this saving to the platform men as a bonus, provided they saved it by better and more efficient operation of the equipment, and the remaining 50 per cent could be used for any other purpose we might select such as the purchase of new equipment and the like. The strange thing is that a company would not have to spend any large amount of money to obtain this saving unless it desired to purchase meters, in which case the cost of them could be taken out of your share of it.

Many economies such as those I have mentioned can be realized through the efforts of the trainman and through no one else. School the recruit from the very beginning of his service in the proper practices of car operation, follow him up with expert supervision in his every-day duties and gain his interest by sharing the profits he is earning. The results of these efforts will mean more profits to your company.

Digitized by Google

New MAINTENANCE CONTEST

Quarterly prizes and individual cash prize to be awarded on substantially the same basis as in previous contests. New plan for company award to be announced later

ELECTRIC RAILWAY JOURNAL plans to continue, during the coming year, the Maintenance Contest so successfully conducted during the past several years in co-operation with the American Electric Railway Engineering Association. The conditions and rules of the new contest are substantially the same as those of the last previous contest, except in so far as the company award is concerned. It has been decided to broaden the scope of this feature of the contest, and new rules are being formulated. These will be announced later.

The committee of judges for the contest will consist of W. W. Wysor, chief engineer United Railways & Electric Company of Baltimore; R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.; W. J. Quinn, electrical engineer Third Avenue Railway, New York, N. Y.; A. W. Baker, engineering secretary A.E.R.A.; and J. A. Miller, Jr., editor ELECTRIC RAILWAY JOURNAL.

Rules

1 The contest will be judged and the prizes awarded by a committee of the American Railway Engineering Association. All decisions of the judges in interpreting the conditions of the contest and in making awards will be final.

2 Quarterly prizes of $25 will be given for the best items submitted in each of four departments. The best maintenance idea submitted during the entire contest period will receive an award of $100. A minimum of $5 will be paid for each item published.

3 Articles may describe any maintenance practice or device used by any department of a railway, such as the maintenance of rolling stock, buses, shop equipment, or methods and equipment for overhead line repairs, power distribution and power generation devices, signal work, track and way maintenance, etc. The judges will determine the classification under the following divisions: (1) rolling stock and shops; (2) way and structures; (3) electrical and line; (4) buses and garage.

4 Articles submitted for these prizes should be *preferably* 100 to 200 words in length and should be accompanied by at least *one* illustration. Brevity consistent with a proper presentation of necessary information will be given weight in judging articles. In no event should they be longer than 400 words. Write on one side of the paper only. Have the article typed if possible, but manuscript written long hand will be accepted. Whenever possible include data on cost savings effected.

5 In rating the various articles the committee will consider the primary value of the method or device as of highest importance. The committee will also consider its practicability, the advantages and economies that are set forth and the clearness and completeness with which the idea is presented.

6 Any employee or official of an operating electric railway or bus company may compete for the prizes.

7 Each contestant may submit any number of items he desires, each of which will be judged separately. An individual may win several of the prizes. Manuscript must be marked "Maintenance Competition." Any number of items may be sent in the same envelope.

8 The author does not necessarily have to be the originator of the idea, but it must be adopted and be in use on the property with which he is connected. The idea submitted may have originated on another property or may have been furnished by a manufacturer. No device or method, a description of which, to the knowledge of the contestant or the judges, has been previously published, will be eligible for this competition. More than one article covering the same device or method will not be accepted.

Additional copies of these rules and full details of the contest may be obtained upon application to ELECTRIC RAILWAY JOURNAL *or the American Electric Railway Association.*

9 Where the management of a railway has a practice of requiring approval of articles sent out for publication, such approval *must accompany* the manuscript. If written approval does not accompany the manuscript it will be assumed that such approval is *unnecessary*.

10 An article may be submitted by several persons or by a department, and need not be written by the person in whose name it is submitted. The prize will be awarded to the individual or department whose name appears on the manuscript, and may be distributed among the winners on any basis determined upon by them. Should there be a tie for any prize the full amount will be awarded for each of the articles involved in the tie.

11 All articles should be addressed to the Contest Editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue at 36th Street, New York City. Items to be eligible for the first period prizes must bear a postmark not later than Jan. 31, 1931; for the second group not later than April 30, 1931; for the third group not later than July 31, 1931.

12 The announcement of winners of departmental prizes will be made in the issue of ELECTRIC RAILWAY JOURNAL in the month following the closing date for each group of departmental prizes.

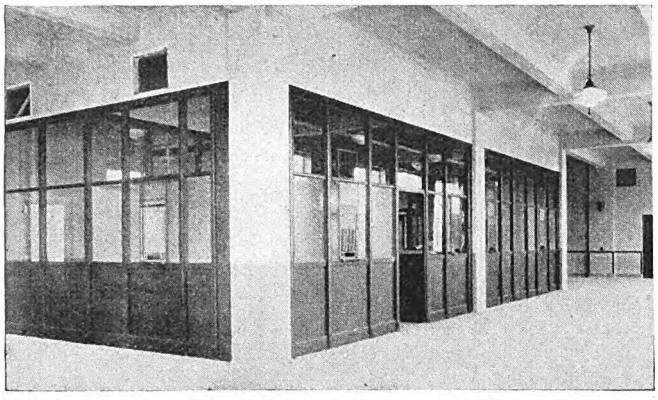
13 Material submitted in the contest may be published at any time.

14 ELECTRIC RAILWAY JOURNAL shall have exclusive right to the publication of all material entered in this contest. All articles submitted will become the property of ELECTRIC RAILWAY JOURNAL and no manuscripts will be returned.

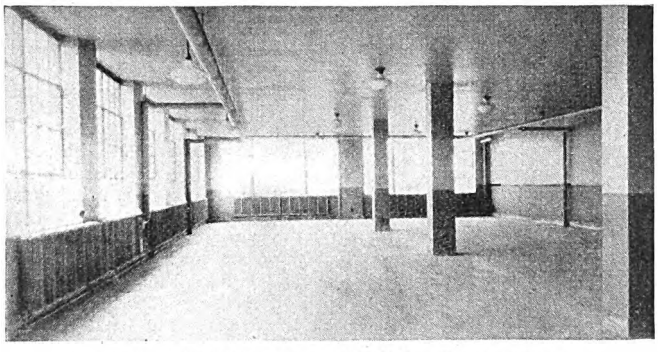
Digitized by Google

Ornamental brick construction gives attractive appearance to the two-story front of new Wyoming carhouse of the Department of Street Railways, Detroit

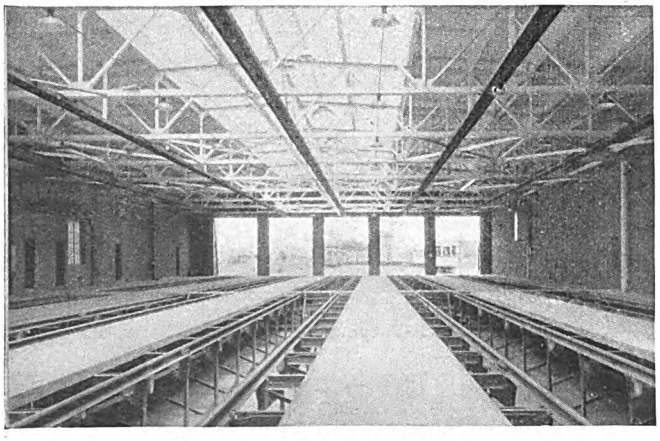
New Carhouse



A spacious lobby surrounds offices of station master and cashier



Large quarters are provided for the comfort of car crews



Open-type repair pits facilitate car inspection

ADDITIONAL storage and service facilities have recently been made available to the Department of Street Railways, Detroit, through the construction of a combined office building and carhouse. Carefully planned and well constructed, the building has many desirable features including excellent light, good ventilation and a pleasing appearance. It contains office quarters, a lobby, inspection pit room, workshop, car washroom, paint room, boiler room, dormitory and comfort facilities for repair men and car men.

The building is located on a large tract of land at Wyoming and Michigan Avenues in the city of Dearborn, a short distance from the Ford Motor Company plant. It is 222 ft. long and 176 ft. 8 in. wide. A two-story front faces Wyoming Avenue and extends to the rear for a depth of 36 ft. With the exception of the roof, which is of wooden construction, the entire building is of concrete, steel and masonry. Colonial face brick, laid in ornamental patterns, is used for the two-story portion of the building. This portion is also ornamented with door hoods, inset panels, pilaster caps and a heavy coping of stone.

The office quarters are on the first floor. They include the lobby, superintendents' and station masters' offices, cashiers' enclosures, a room for records and a lavatory for the office staff. The lobby is spacious and well lighted, and has a terrazzo floor in shades of buff and black. Its walls are lined to a height of 3 ft. 6 in. with a wainscot covered with imported ceramic tile in pastel shades of buff and green, bordered with black. The rest of the interior is plastered and finished with flat ivory tint.

The superintendents' and station masters' offices and cashiers' enclosures are floored with asbestos tile in a checker-board pattern, in maroon and black. The partitions are of steel, 10 ft. high, finished in imitation mahogany and are glazed with Florentine and polished plate glass. A steel staircase with terrazzo treads leads from the first floor lobby to the assembly room on the second floor. Adjoining the lobby is the record room fitted with

Digitized by Google

shelving and provided with ventilating ducts. The cashiers' enclosures are of wire mesh extending to the ceiling, and having sliding doors fitted with special locks. Illumination of the lobby and offices is obtained from ornamental hanging fixtures. Bronze-finish wall fixtures of the pocket type for indirect lighting give additional illumination in the lobby.

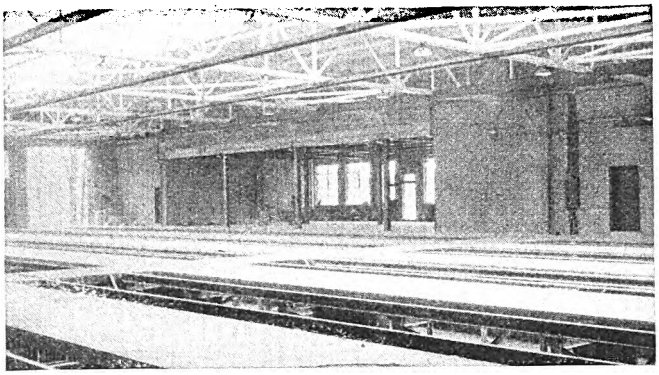
The entire second floor is given over to the convenience and comfort of car crews. It contains an assembly room, 34x79 ft., a locker room 34x79 ft., and a dormitory 34x38 ft. 6 in. A washroom is located near the lockers. It is equipped with shower bath, and is lighted and ventilated by a large skylight.

The pit room of the carhouse is 79 ft. wide and contains ten repair pits each 100 ft. long over which twenty cars or ten trains may be serviced at one time. Inasmuch as all track work on the premises is laid down for rotary

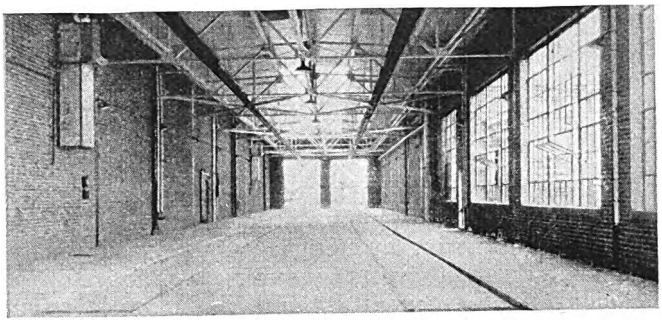
Built at Detroit

traffic, movement of the cars through the entire carhouse is accomplished with maximum efficiency and minimum loss of time. All repair pits are of the open type. Steel bents, light yet sturdy, support the tracks and the concrete walks. Beside the tracks, a 2-ft. open space between each rail and the edge of the walk adjoining, permits ready and convenient adjustment to running gear from both lower pit floor and walk. The space under the floor slabs is utilized for storage of spare parts and tools. It also accommodates the numerous radiators, which, in addition to the indirect heaters near the ceiling, comprise the heating facilities of the pit room. At one side of the pit room is the shop space, 36x68ft. Here the air compressor, forge, lathe, drill press and work bench are located. On the same side are also a washroom and lockers for the repairmen and an oil storage room.

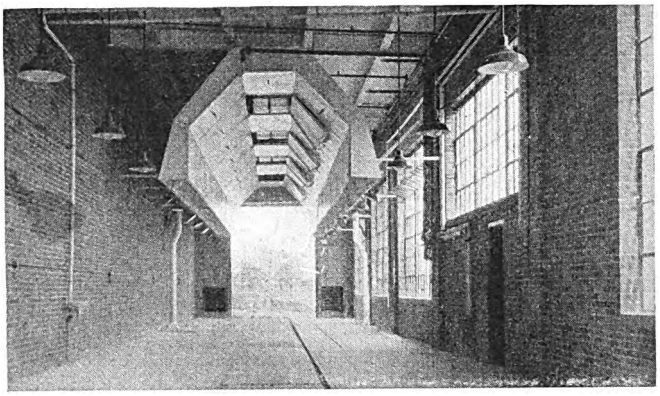
Over the repair pits, giving a maximum of light and ventilation, is a skylight 24 ft. wide and 180 ft. long,



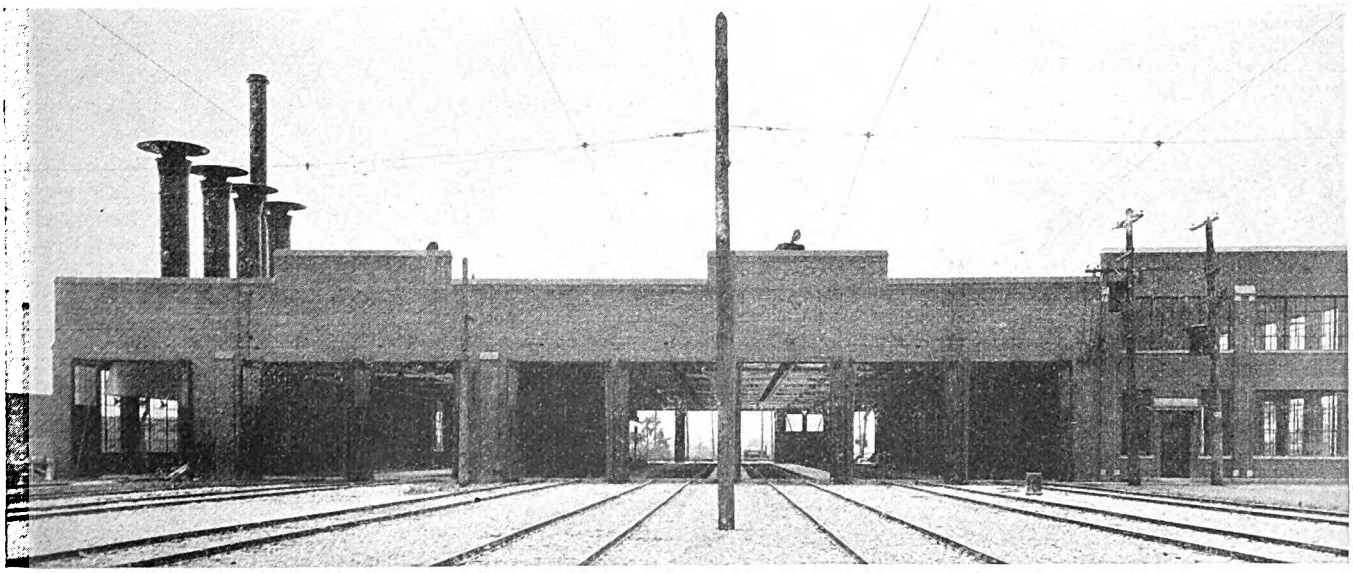
Workshop is conveniently located at one corner of pit room



Spacious washroom will accommodate eight cars at a time



Paint shop is equipped with an all-metal spray hood



Offices are on the Wyoming Avenue side at the right. Next are the inspection pits. At left are the shops

Digitized by Google

equipped with five ventilators, 48 in. in diameter, with cowls rotating on ball bearings. Adjoining the pit room is a wash rack with two tracks running its length. The facilities installed in this room will permit the cleaning and washing of eight cars at one time. Ample light and ventilation is obtained from a large skylight on the roof and steel sash in the side wall. Numerous floor drains, hot and cold-water outlets, and facilities for the installation of car-washing sprayers have been provided. A storage room for washers' supplies is also located here.

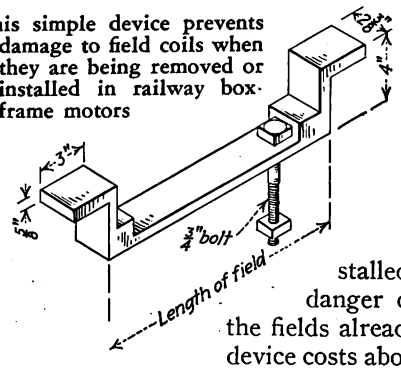
Next to the wash rack is the paint shop which is 22x120 ft. This shop is entirely fireproof, reinforced cement tile having been used in the roof construction. The all-metal spray hood for spray painting is 40 ft. wide and 61 ft. long. Two blowers at the side walls force a volume of air into trenches parallel to the track. This air is released through a longitudinal slot in the top of the trench, forming an air curtain along the object being sprayed. The spray residue carried upward by the air, is caught by the exhaust of a series of blowers connected to four ventilating stacks, 42 in. in diameter and 20 ft. high. A sprinkler system is also one of the features installed to eliminate fire hazard.

The entire building is heated by two steel tubular boilers equipped with automatic stokers. They are installed together with an auxiliary water heating boiler in a boiler room, 40x56 ft. under the easterly part of the building. In the boiler room are also located various pumps which complete the heating plant. These include duplex vacuum pumps, hot water circulating pumps and two automatic sump pumps. A large coal storage room and an ash room, in which is erected an electrically operated ash hoist, are included in the boiler room area.

Clamp for Installing Field Coils*

By R. Dumke
Foreman Mechanical Department Cleveland Railway

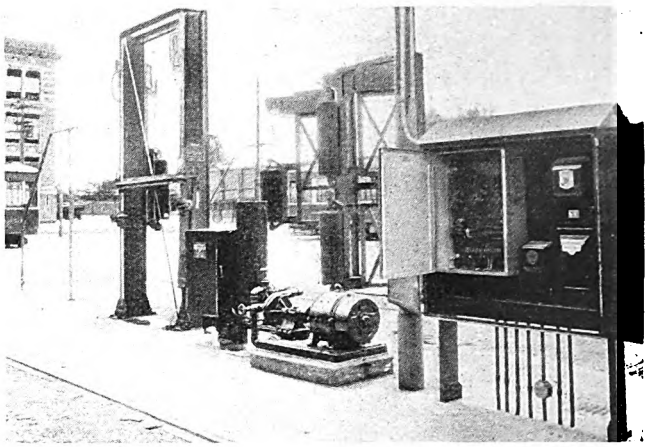
INSTALLATION of field coils in box-frame motors is facilitated by the use of the clamp illustrated, which was designed and constructed in the motor department of the Cleveland Railway. As may be seen in the illustration the device is very simple. By its means the adjacent fields can be held in place securely, while they can be shifted so as to allow the new field to be installed without any danger of injuring it or the fields already in place. The device costs about $5. It replaces the old method, in which it was necessary to remove the pole pieces in the adjacent fields in order to loosen them so that a defective field could be taken out and a new one installed. The adjacent fields had to be blocked or held in place, after which the old field was forced out and the new one forced into place. Frequently the new fields or the ones adjacent were damaged or shorted.



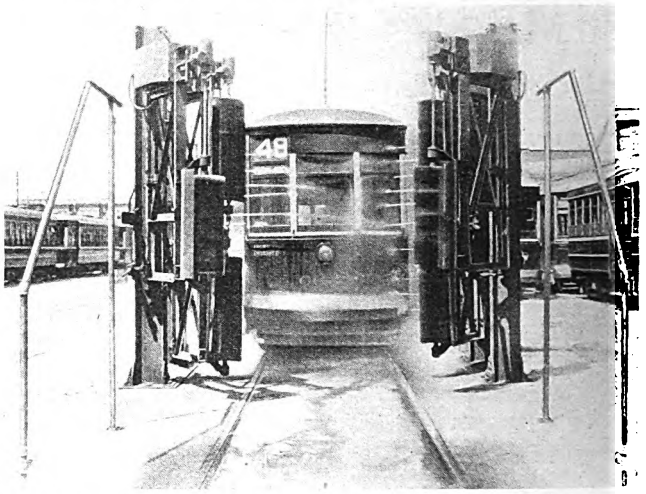
This simple device prevents damage to field coils when they are being removed or installed in railway box-frame motors

Submitted in Electric Railway Journal Prize Contest.

Car Washing Machines Make Large Savings in Philadelphia



Car washers of this type are installed at five principal carhouses in Philadelphia. As the cars pass through the machine they are wet with the sprays, then scrubbed by rotating brushes and finally rinsed by another spray



SOME time ago the Philadelphia Rapid Transit Company began experiments in the use of car washing machines for use on its surface lines. The original machine was quite similar to that developed some time ago by the Pittsburgh Railway. After adapting the machine to the requirements in Philadelphia, five were purchased from Leeds, Tozzer & Company, of New York. The new machine, as installed at the Luzerne carhouse, is shown in the illustration.

There are two steel uprights, one on each side of the track to which swinging arms are attached. At the free ends of these arms are rotating brushes worm-driven by electric motors. At each side are two vertical pipes pierced with holes through which water sprays on to the car prior to scrubbing by the brushers, and at the rear ends of the machine are additional spray pipes for rinsing the car after the scrubbing. The electric motors and the water valve are automatically actuated by means of switches inserted in the trolley wire so that the entering car starts the motors and opens the water valve. As the car passes out the second switch shuts off the motors and the water supply.

As the cars approach the washer, the front and rear ends are wet with a hose and scrubbed by hand with brushes. The operator then starts the car and as it passes the switch the water is turned on automatically.

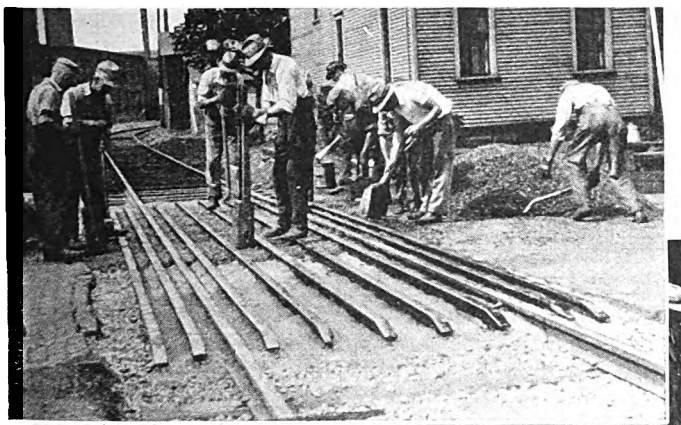
Digitized by Google

On the section of the trolley wire which supplies the car while it is passing through the machine, there is a series connected resistance to reduce the speed to about 1.5 m.p.h. The time taken in passing through the machine is approximately 1½ minutes. Including the time for scrubbing the ends, it is possible to put through approximately fifteen cars per hour.

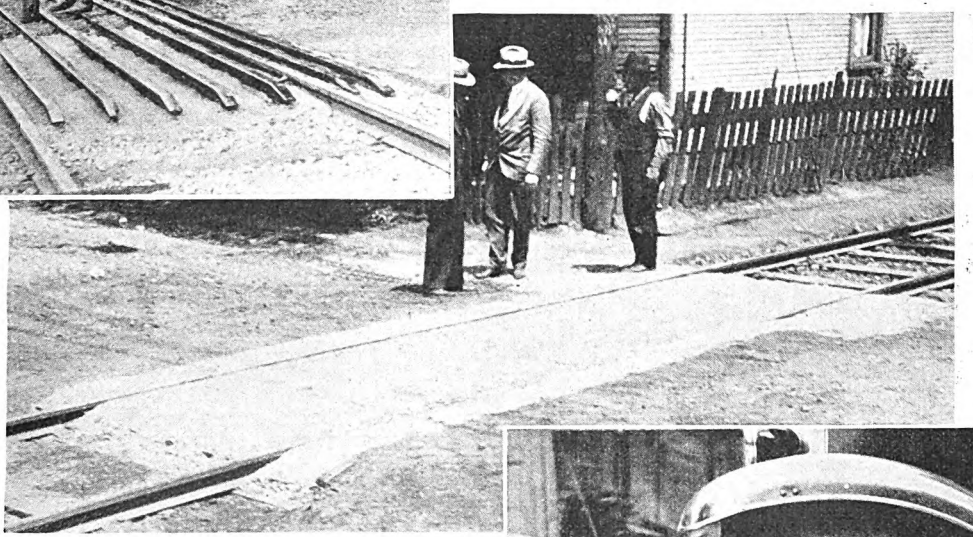
Formerly fourteen men were required to wash the cars on a nine-day schedule. At present, seven men are able to wash the cars on a six-day schedule, with a much better appearance resulting. Installation of the automatic machines at five of the largest carhouses on the system has resulted in an annual saving of $28,000 per year, entirely made up of labor economy.

Grade Crossing Constructed for Heavy Vehicular Traffic

OBJECTIONABLE grade crossings which experience considerable vehicular traffic on the lines of the Stark Electric Railway, Alliance, Ohio, have been improved by the construction of a new type of permanent crossing. This has replaced the plank construction in several cities. Scrap steel rails are used with a cold pack paving material.



Cold pack is firmly tamped between rails of the crossings used by the Stark Electric Railroad

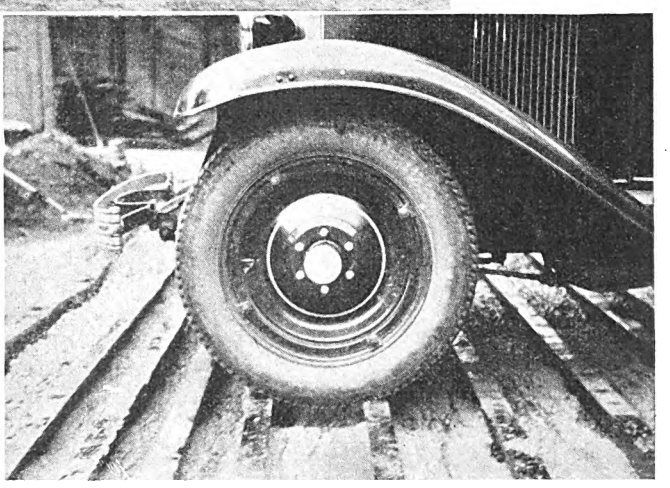


Highway crossings made with scrap rails and macadam filler give a uniform surface and last better than those made with planking

Where a crossing is to be constructed 70-lb. running rails with tie plates are placed on new creosoted ties ballasted with No. 34 slag. Joints are welded. Five lengths of scrap 70-lb. rail are placed between the running rails. Two other lengths are placed outside each running rail. The two outside rails, the running rails and the first intermediate rails are 6 in. apart. The three other inside rails are about 9 in. apart. All rails are spiked to the ties. The base and web of the rails placed between the running rails are cut off about 1 ft. from each end. The remaining heads are bent down to an angle of 45 deg. in order to prevent them from catching snow plows or other equipment operating over the crossing. Under the five intermediate rails and one outside rail on each side hardwood strips of the same thickness as the tie plates are nailed to the ties to bring all rails to the same height. The two outermost rails are therefore ½ in. below the rest.

After the rails have been laid No. 34 slag is tamped between the ties to the bottom of the rails, and above this No. 7 slag is used as a filler. Upon this a cold pack is laid up to ½ in. above the intermediate rails. Before this step, however, the slag and the rails are painted with Headly oil to make the cold pack adhere to the base. The cold pack, which is a patented product, is composed of slag and tar, mixed under heat, as the basic materials. It is tamped into place in small quantities to insure a well packed finished surface. Finally, No. 7 slag is sifted over the cold pack to take up the excess tar. No flangeway is provided, as the wheel flanges will cut their own clearance after a short time.

Crossings of this type have been constructed in the cities of Canton and Salem, Ohio, where traffic exceeds 1,500 vehicles per day. The same type of construction is to be installed on a crossing where the motor traffic will be about 10,000 vehicles per day.



Rails are spaced close enough to bear vehicular loads even without the paving

New Maintenance Contest Begins on Nov. 1

SEE RULES ON PAGE 701

Digitized by Google

Lamp Cord Used for Controller Testing*

By J. Munford
Electric Foreman, Ottawa Electric Railway
Ottawa, Canada

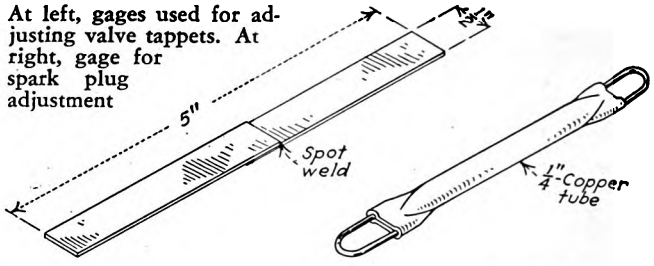
WHEN no test lights are available to test controllers for grounds, a piece of lamp cord is used instead, in the shops of the Ottawa Electric Railway. One end of the cord is connected to the bottom of any high-resistance unit on a bell interrupter. By using a screw-driver to ground various reverse fingers to the frame of the controller, open motor circuits can be located easily. This makes a handy emergency test if the conventional test lights are not available.

Simple Feeler Gages*

By Hoy Stevens
Assistant Superintendence of Maintenance Cleveland Railway

WHERE adjustments of various sorts must be made on motor coaches with definite permissible tolerances, feeler or limit gages have given the simplest and quickest method available to determine acceptance or rejectance of the work. Two places where this type of inspection has proved desirable are on valve tappets and spark plugs.

A maximum and minimum limit gage for adjusting tappets was made in the Cleveland Railway shops by spot-welding together two 3x½-in. strips of steel feeler gage stock, of which one piece is 0.004 in. thinner than the other. The thicknesses have been selected so that if the thin end will go between the tappet and the push rod while the thicker one will not, further adjustment is unnecessary. New adjustments are made to within these limits. The appearance of the gage is shown in the illustration.



At left, gages used for adjusting valve tappets. At right, gage for spark plug adjustment

The second gage illustrated has been made for adjusting spark plugs. Here, two 3-in. lengths of piano wire have been looped and inserted in the end of a 3-in. copper tube of ¼-in. diameter. One of the wires is 0.002 to 0.003 in. smaller than the other. Gages of this sort are furnished to all workmen who have use for them.

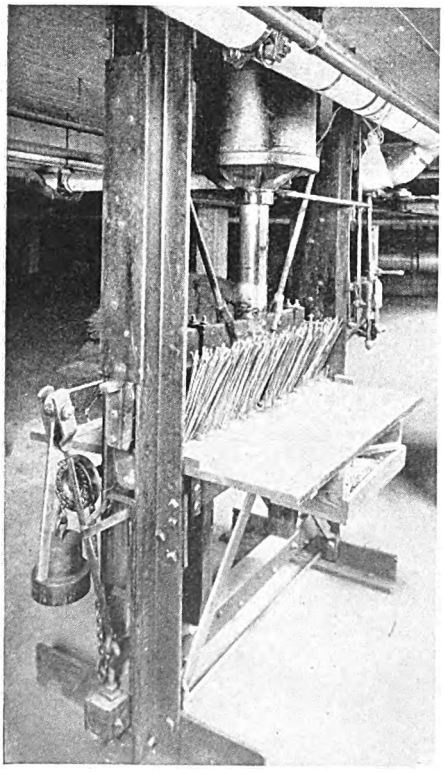
Filling Sweeper Broom Blocks by Machine*

By Terance Scullin
Superintendent Equipment and Buildings
Cleveland Railway

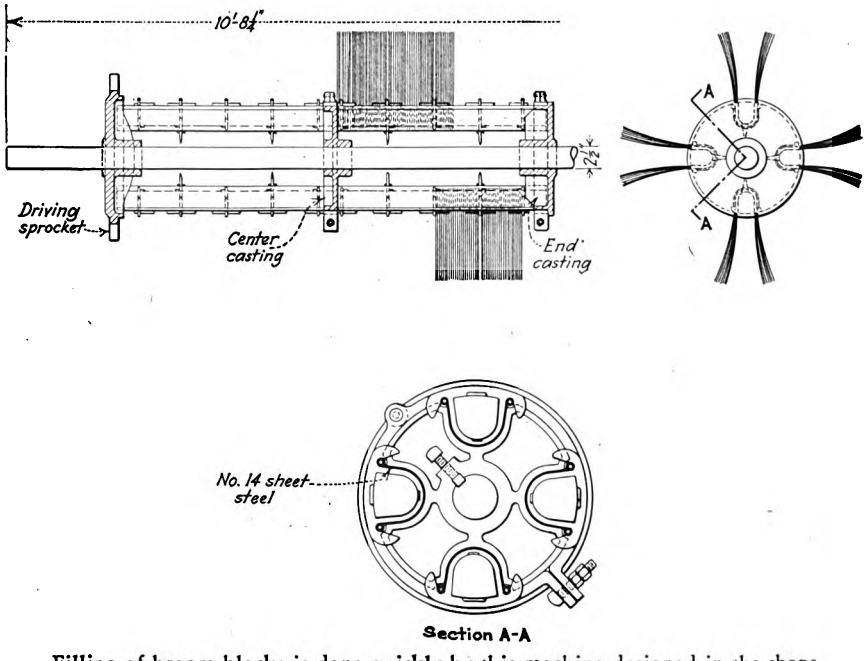
SWEEPER broom blocks of the Cleveland Railway are now made with steel holders in a filling machine designed in the shops. The broom holder consists of a half-round channel section, closed at the ends. A locking section has lugs which pass through the channel section when the steam-heated rattan is pressed into shape by the air-operated cylinder. Pins are then placed in the holes of the lugs, binding the sections firmly together.

Under the old system it took 2½ hours to fill a wooden broom block by hand, while with the new system two men can fill sixteen of the new type broom blocks in an hour. By the use of steel holders in place of the old wooden ones, a saving of 33⅓ per cent in holder replacement was made.

*Submitted in Electric Railway Journal Prize Contest.



Type of broom with steel holders made by Cleveland Railway



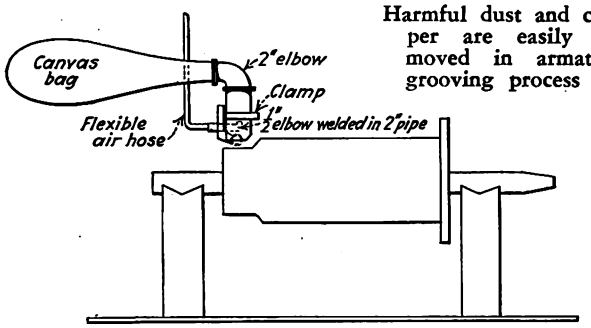
Filling of broom blocks is done quickly by this machine designed in the shops of the Cleveland Railway

Digitized by Google

Copper and Mica Dust Collected on Commutator Slotter*

By H. J. Beadle
Equipment Engineer
Dallas Railway & Terminal Company

FOR the removal of copper and mica dust from the surrounding air during the process of grooving a railway armature, it was decided to use in the shops of the Dallas Railway & Terminal Company, a device based on the ejector principle. The device is simple and cheap, and uses very little air.



Harmful dust and copper are easily removed in armature grooving process

A pipe clamped to the bracket carries the saw of the grooving machine. The diameter is 2 in., so as to fit down over the saw. Inside the 2-in. pipe is a ½-in. elbow which is welded to the outside of the pipe and extends outside and beyond it for 2 in. A flexible ½-in. hose is connected to the short piece and delivers the air to the ejector. A canvas bag, placed at the end of the 2-in. pipe, receives the copper filings and mica dust.

Repairing Switches for Portable Crossovers*

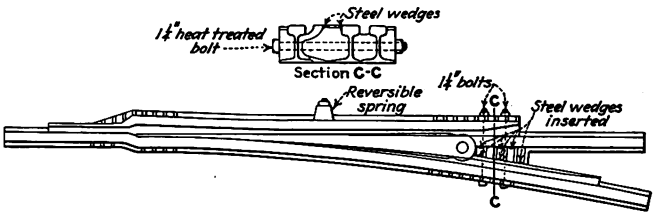
By E. B. Spenzer
Special Work Engineer
Cleveland Railway

LOOSENING of the heel rails in the casting is the first sign of failure in iron-bound switches used in portable crossovers. Immediately afterward the tongue starts to work loose and soon loses its bearing at the heel and pin. It then shears off the heel fastener, without which it is unfit for service, the tongue jumping in the bed during the passage of cars and causing frequent derailments.

Practically all the 44 switches of this type belonging to the Cleveland Railway have had the heel rails work loose. Otherwise they were too good to scrap. The following method to repair them was devised, and the work was done by the local manufacturer who furnished them originally.

New Maintenance Contest Begins on Nov. 1

SEE RULES ON PAGE 701



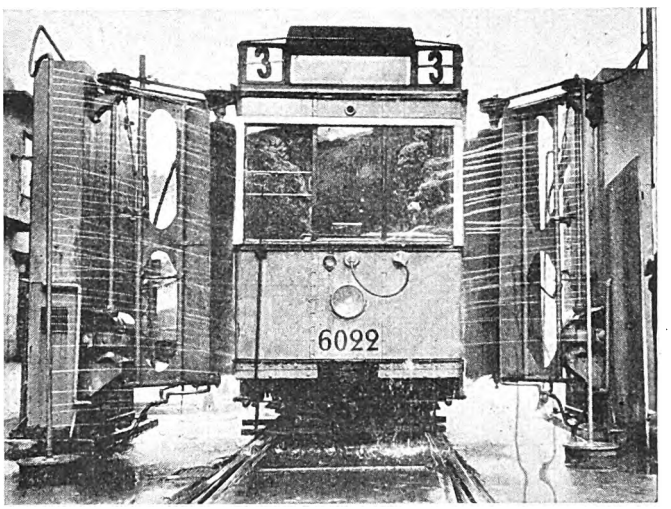
Worm switches for portable crossovers are repaired in Cleveland by bolting up and welding the damaged parts

First, two holes were drilled through the iron casting and rails at the heel and 1¼-in. heat-treated bolts were placed in the holes and pulled up as tightly as possible. Then small steel wedges, ⅛ in. thick and 2 in. wide were driven between rail and casting and spot welded to the rail. The remaining space was filled with spelter.

Next the tongue was refitted by spot welding on the pin and grinding off the excess metal until a bearing as good as possible was formed. A new heel fastener was fitted on and the switch tread ground at the heel to a good running surface. The other repairs consisted of building up worn guards at the heel and toe and replacing the necessary shoes on the base.

This method of repair has been extended this year due to the excellent results under traffic with switches previously repaired. The life of the switches has been doubled or more than doubled at a cost of $60 per switch, or 17 per cent of the cost new.

Berlin Street Cars Washed by Machine



Modern car washing apparatus used in Berlin, Germany

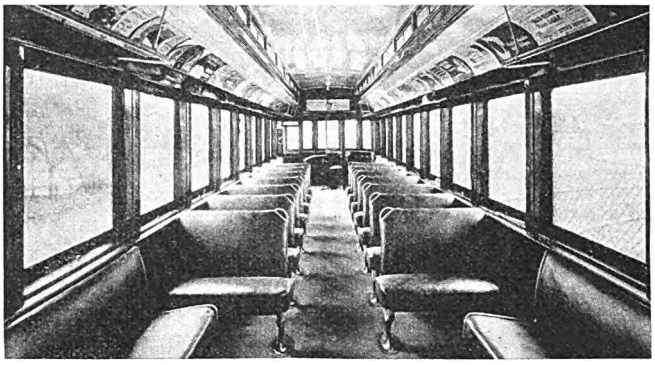
MODERN car-washing machinery has recently been installed by the street-railway in Berlin, Germany. This consists of vertical perforated pipes placed on both sides of the wash track together with a pair of motor-driven revolving brushes. As with similar apparatus used by a number of electric railways in this country, the car moves slowly through the washing machine where it is first sprinkled and then scrubbed. The operation is simplified by the fact that the cars have straight sides as shown in the accompanying illustration. All cars are cleaned in this way every morning before being placed in service.

*Submitted in Electric Railway Journal *Prize Contest.*

Digitized by Google

Seating Capacity of Cars Increased in Winnipeg

REMODELED cars have been recently placed in service by the Winnipeg Electric Company. Work on these cars has been in progress in the shops of the company since July with a crew of 246 men. The mechanical equipment has been thoroughly overhauled



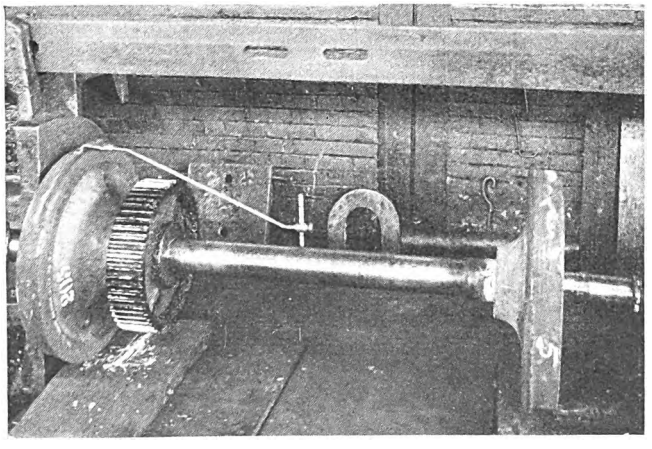
New cross-seats installed in remodeled cars at Winnipeg have increased seating capacity from 39 to 51

and renewed where necessary, and the interior has been redecorated in a more pleasing manner. Facilities have been provided for front exit to avoid the congestion experienced every winter by passengers crowding toward the rear end to alight. Slated flooring has been replaced with battleship linoleum. The seating capacity of the cars has been increased from 39 to 51 passengers by the installation of new cross-seats at a cost of $600 per car. These seats embody the latest design of interior car equipment, having leather surface and spring cushions.

Gage Makes Wheel Mounting Easy*

By Terance Scullin
Superintendent of Equipment and Buildings
Cleveland Railway

FINDING the location of the wheel first pressed on the axle is facilitated by use of a gage adaptable to all wheel sizes, which was developed by the Cleveland Railway. The gage consists of a steel rod, bent as shown in the illustration, with a casting on one end which is designed to rest on the tread and against the flange of the wheel, while the other end has a drilled knob with a knurled setscrew. This device holds a $\frac{5}{6}$-in. round steel rod about 7 in. long, pointed at one end. The setscrew fits into V-cuts in this rod spaced at the necessary distance to conform to wheels of different sizes. By making a punch mark at the center of the axle, it becomes a very simple matter by using the gage to mount the first wheel at the proper distance from the axle center, a job which has heretofore been very difficult.

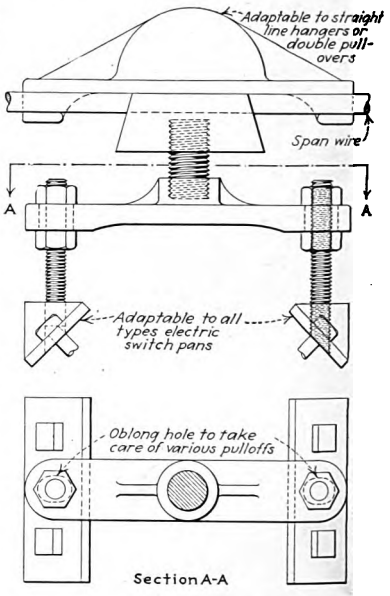


Locating the first wheel on the axle is facilitated by a gage designed in the shops of the Cleveland Railway

Adjustable Hanger for Switch Contactors*

By H. A. Brown
Foreman Return Circuit, Switch and Signal Division
Cleveland Railway

ELECTRIC track contactors on the Cleveland Railway are set and held in position by an adjustable hanger which was developed by the switch and signal division and has been adopted as standard. This hanger, which is readily adapted to any type of overhead contactor, is shown in the illustration. A casting designed for the purpose fits the top of the contactor side bars on either side. It is provided with a boss drilled and tapped to take a $\frac{5}{8}$-in. stud. A cross-member, with oblong holes, is placed over the studs and a bell type hanger is screwed into the center of the cross-member so that the contactor may be attached to the span wire. By raising or lowering the stud nuts below the cross-member, the proper position for the contactor in relation to the trolley wire is found, and the position is held by tightening the stud nuts above the cross-member.



Adjustment of electric track switch contactors is made easy by this hangar designed by the Cleveland Railway

This device replaces the old method, by which the overhead contactors were held in position by driving a staple in each of the contactor side bars, after which it was tied to the span wire with pieces of small wire. Breakage of these small tie wires would permit the contactor to turn on the trolley wire, resulting in switch failures. At best, the device was unsightly and was not satisfactory. The new device has resulted in a great reduction of electric track switch failures and a considerable cut in labor costs. When installed over the trolley wire it has a neater appearance than the old device. The hanger is easily adaptable to all types of electric switch pans.

**Submitted in* Electric Railway Journal *Prize Contest.*

Digitized by Google

When Should Contact Line Be Renewed?

By Angus Scott
Assistant Superintendent of Overhead Lines
Cleveland Railway

The author proposes a formula based on relative costs of replacement and repairs

IN CONNECTION with the renewal of contact wire, the statement one hears most frequently advanced by operators is: "Take it down before it falls down." This policy is, however, productive of much waste. It is the purpose of this article to show that a better statement is: "Take it down when it costs too much to keep it up."

Contact wire renewal is divided into three general classes; namely, pieces, spans, and a complete mile or section of line from section insulator to section insulator. It is comparatively simple to determine when to renew a short piece of wire, as at an acceleration point, but to decide when to renew an entire section of line involves a number of factors. One of the chief considerations is that of taking down some wire and materials still possessing considerable capacity for wear along with the worn-out wire. The problems then presented are: (1) Should the line be repaired or restrung? and (2) Is it more economical to take down some good wire along with the worn-out wire than to repair the bad sections?

For example, consider a new 1-mile section of line on a street with varying grades and approximately nine car stops, some at the start of the grades and others at coasting points. The stops will vary in importance and the number of cars stopping will likewise vary. The differences in wire wear or burning will correspond. Then, too, some of the grades will be more severe than others, with unequal wear on the contact wire due to arcing.

After a certain number of car movements, it will be necessary to cut in pieces or spans in the places where the wear is greatest in order to maintain a suitable factor of safety, say, 0.250 in. on No. 00 round trolley wire. As time goes on the original mile will contain stretches of wire of varying cross-sections. The inspector would indicate such successive areas as follows: good, bad, good, fair, good, fair, bad, fair, etc.

Up to this point, the economical procedure in maintenance would be to cut out worn parts and replace with new wire. After a certain time this piecing fails to result in any economy on account of the labor involved, the maintenance of expensive fixtures such as splicers, and the cutting out of short pieces of wire at hard spots or acceleration points, such wire having been installed on former maintenance programs. In addition to the foregoing factors, wire which would be economical to repair in one area would not be considered so in another, due to the number of car passes.

Starting with these general facts, together with the assumptions granted, a formula is proposed for contact wire replacement:

When the over-all cost of annual repairs, including splicers, etc., aside from the normal ear replacements, approximates one-half of the cost of restringing, the contact wire should be renewed if the line receives 200,000 *or more car passes per year.*

Before renewing a section of wire on this basis the practice would be to determine sufficiently in advance just when replacement should be made in the area involved. Upon reaching this decision, all maintenance and renewal of fixtures should be stopped in this area. The time allowed before renewal should be sufficient to obtain maximum life from all the fixtures in the area.

Analyzing the cost of renewal and of repairing a mile of wire, such as the one just described, we find comparison between restringing and repairing with short pieces will be as shown in the table. The sum of $129.41 represents the actual difference between repairing and restringing the line. This will, of course, vary with the price of copper, being lower as the price is reduced.

From the above it readily may be seen that to repair wire in such condition on a line which averages 200,000 car movements per year would not be economical, since

Comparison of the Cost of Restringing a Mile of 00 Trolley Wire With the Cost of Repairing It

Restringing		
Labor for stringing, insulating and aligning	$ 52.57	
1 mile of 00 wire at $19.65 cwt.	425.99	
Fixtures—ears, splicers, etc.	40.90	
Total cost of restringing	$519.46	
Salvage value at 14 cents per lb., wire 70 per cent by weight	221.05	
Actual renewal cost		$298.41
Repairing		
Labor for stringing 1,000 ft. of wire at 5 cents per foot	$ 50.00	
Ear renewal on periods skipped	20.00	
1,000 ft. of 00 copper, salvage allowed	40.00	
Ears, splicers, armor, etc.	29.00	
Maintenance above normal on repaired line per year	30.00	
Cost of repairing for 1 year		$169.00
Net cost of restringing		$129.41

maintenance costs on a repaired line increase rapidly over normal maintenance due to the renewal of splicers and trolley armor. After operating for a year over the line following such repairs, many of the fixtures installed would have to be renewed, and also much of the original wire which was not replaced the year previous would require piecing. When the cost of this is calculated, it will, in all probability, be great enough that it will be decided to restring the entire line rather than maintain the necessary additional splicers and fittings. By restringing the line at this time, the labor and material of the previous repairs would be practically wasted. Thus it would not be economical to retain the structure by repairs for the additional year's service.

In the cost of repairing the line there is an item of $20 for labor and material for ear renewal periods skipped. This item is included there because if it were decided to restring the line rather than repair it, ear renewals would be skipped for a number of months, saving the labor and material which would be required if the line were repaired.

Results from actual experience show that the labor costs of repairs and inspections on a line remain fairly constant up to about 500,000 car movements. Then the cost of maintenance increases rapidly due to the cutting

Digitized by Google

in of pieces or protection of acceleration points. Costs should be computed when No. 00 standard hard-drawn trolley wire approaches 1,000,000 car movements. Extensive repairs undoubtedly will be required then on a line averaging 200,000 car movements per year depending, of course, on the kind of wire and class of service. If it is found that the cost of repairing ($169) is approximately equal to one-half the cost of renewal ($298.41), the wire should be restrung.

The writer does not contend that the formula proposed is applicable to all wire renewals. It is his belief, however, that a formula covering wire renewals could will be developed by the industry. His experience suggests that the straight line formula proposed, rather than the parabolic formula of increasing annual expenditures, will apply very well to contact wire renewals.

Motor Field Shunting Gives Old Cars New Pep

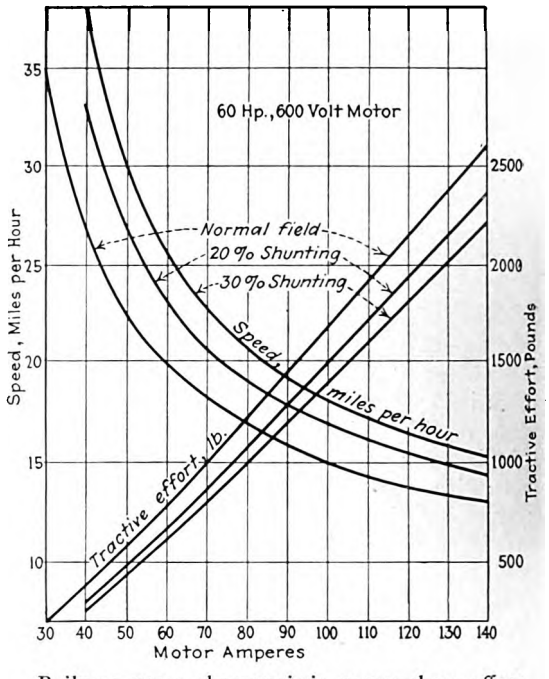
By G. L. Moses
Renewal Parts Engineer
Westinghouse Electric & Manufacturing Company

IMPROVEMENT of schedules is possible by the adoption of a relatively simple means of speeding up street cars. It has long been known that shunting part of the current of a series railway motor around the field results in an increase of speed. Recent agitation to increase schedule speeds has led to extensive investigations of the commercial feasibility of such a scheme. Field shunting is accomplished by the addition of a few switches with a controlling relay and helical resistor units. This provides an extra accelerating point after the full parallel running position has been reached and increases the free running speed of the car. Tests conducted thus far indicate that considerable increases in schedule speeds are possible in many cases with field shunting.

From an economic standpoint this is of great value as the increase in schedule speed permits better service with the same equipment, or reduces the amount of equipment required for a given service. The cost of the equipment plus the cost of installation is slight compared to the benefits which can be derived from field shunting properly employed. Field shunting is equally applicable to drum or remote control and requires little or no wiring change. Wherever operating companies intend to operate existing cars over the same line at higher speeds, the possibilities of field shunting are well worth a careful investigation.

This scheme has its limitations. Faulty overhead construction, permitting the trolley to disengage, is liable to cause motor flashing. Some types of motors are more adaptable to field shunting than others. These are motors that have a reserve capacity and are free from commutation difficulties with weakened field strength. Helical, edge-wound resistors are used as field shunts on account of their light weight and their inductive characteristic, which reduces the tendency of commutators to flash. It is advisable to use a current limit relay to insure that the field shunting switches are not closed before the motor current is reduced to a safe value. If this is not done, the motors may be unreasonably overloaded, and have a decided tendency to flash.

The percentage of the motor field current which may be safely shunted depends upon the construction of the motor and upon its application. It is necessary to keep within the proper current limits so that excessive heating will not result. Weakening a motor field naturally has a detrimental effect on commutation. Therefore, if we disregard the heating effect, the ultimate limits of shunting is determined by the result on commutation. Each particular application represents a special problem and is worthy of careful consideration. Each operator should try out the scheme on his own equipment and service which he desires to speed. He can then best determine the operating advantages which can be obtained within the limits of his particular application.



Railway motor characteristic curves show effect of field shunting

Copenhagen Orders Experimental Cars

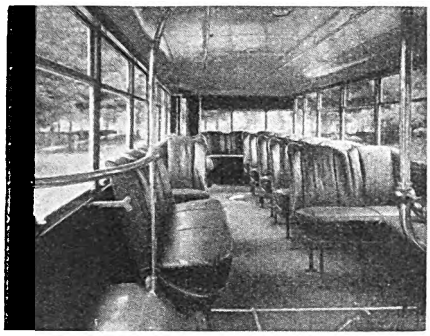
WITH the idea of modernizing its rolling stock, all of which has now been in service for at least ten years, the electric street railway in Copenhagen, Denmark, has built a motor car and a trailer of improved design. Owing to the narrowness of the streets and the sharp curves, single-truck motor cars and trailers have been used in the past. The new cars are of the double-truck type, the motor car seating 28 passengers and the trailer 26. In general the cars follow American design practice, the motor car having end platforms and the trailer a center platform. The over-all length of each car is 46 ft. $4\frac{5}{8}$ in. and the width 6 ft. $10\frac{3}{4}$ in. It has been decided to spread the track centers so that the width of future cars can be increased to 7 ft. $2\frac{1}{2}$ in.

Considerable interest centers in the motor and truck design. Four air-cooled motors rated at 21 kw. at 275 volts and 1,200 r.p.m. continuous load are connected two in series. The drive is through single reduction gears with a ratio of 6 to 1.

If the tests made with these cars show that they meet the demands of Copenhagen's traffic, it is understood that orders for a large number will be placed during the next twelve months.

Digitized by Google

NEW PRODUCTS for the Railways' Use



Seating arrangement has been developed to facilitate circulatory loading

Small-Capacity Bus With Circulatory Loading

SIMILARITY of construction detail to the larger types has given to the small-capacity, single-engine bus, recently developed by the Twin Coach Corporation, the advantage of circulatory loading. Front-entrance and rear-exit facilities, together with a novel seating arrangement to fit, have made this feature possible.

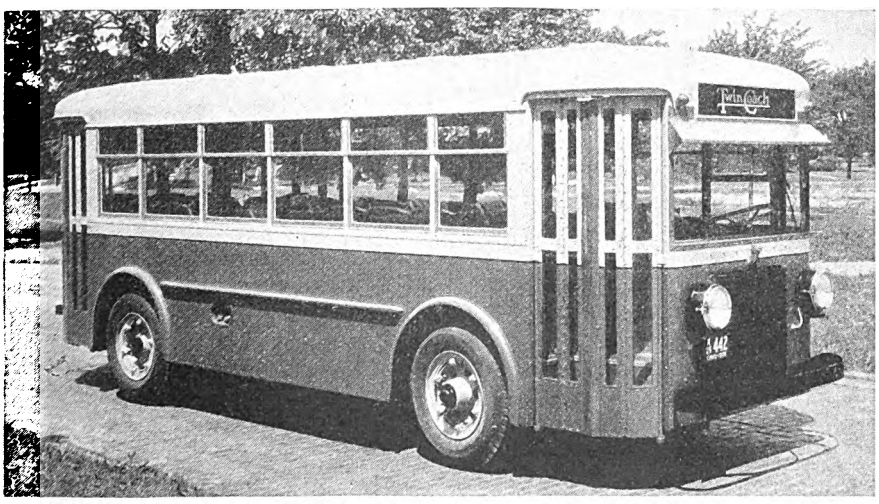
Construction of body and frame is of high-grade steel; body posts are of cold-rolled T-section. All metal joints are painted and primed before assembly with rust-resisting paint. Body sides, ends and roof are sealed with compound. To prevent corrosion, panels are riveted to the body posts and roof carlines with specially treated rust-resisting rivets.

The doors are air operated, each having a 23-in. full opening. The front entrance door is placed ahead of the front wheel, and the rear exit door is placed behind the rear wheel. Seating equipment consists of two-passenger, bucket type seats on the left side and either individual bucket seats on the right side at an angle or longitudinal wheelhouse seats at the front and rear with single forward seats between them. The aisle space provided with this arrangement varies from 15 to 18 in. Seating capacity varies from 20 to 24 passengers depending upon arrangement of seats.

The bus is equipped with a new $4\frac{1}{8}$-in. bore Twin Coach engine, developing 90 hp. Ample brake capacity and long life are assured with four-wheel air brakes using large-size shoes and drums. The rear axle has a bevel gear drive, and the front axle has an especially heavy I-beam section. Both are Timken. The tires are the new 9.00x18 size, with a capacity of 3,600 lb. per tire. Drive shaft is mounted in one midship bearing supported by special rubber mountings to eliminate noise. Steering mechanism is the Ross cam and lever type. Electrical equipment and air brake equipment accessories, transmissions, clutch and drive lines are the same as found in the large Twin bus.

GENERAL DIMENSIONS

Over-all length, without bumpers and visors	21 ft. $3\frac{5}{16}$ in.
Over-all length, with bumpers and visors	22 ft. $10\frac{3}{4}$ in.
Over-all height, loaded	$99\frac{1}{2}$ in.
Over-all width	86 in.
Wheelbase	140 in.
Tread—front and rear	6 ft.
Turning radius—approximate	28 ft.
Interior headroom	73 in.
Step height from ground, unloaded	16 in.
Floor height from ground, unloaded	$28\frac{3}{8}$ in.
Road clearance, minimum under front axle	7 in.
Road clearance, minimum under rear axle	10 in.
Weight, approximate	10,000 lb.



Front entrance and rear exit facilities are incorporated in design of new small-capacity bus built by Twin Coach

Paint to Provide Protection Against Corrosion

AS THE result of research carried out by the chemical and technical staffs of E. I. du Pont de Nemours & Company, a product known as DuLux has been developed, which imparts some of the advantages of Duco to finishes of the paint and varnish type.

It is stated that the product is based on a film-forming material that is an especially developed synthetic chemical compound exceptionally resistant to disintegration. It differs radically in this respect from the natural oils and resins generally used in the manufacture of paints, varnishes and enamels.

A coating of this product dries more quickly than the ordinary finishes, thus greatly reducing the time during which freshly coated surfaces are subject to marring by insects or dust. It is claimed to be unusually resistant to rain damage during the drying period. Laboratory tests, which have been confirmed by thousands of panels exposed to the elements in various sections of the United States, indicate that the new product provides surface protection for an unusually long period of time.

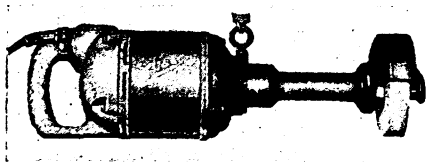
DuLux is now available for industrial uses, including the finishing of machinery and the coating of structural steel, bridges, freight cars and other places where resistance to weathering and corrosion is required.

Digitized by Google

Digitized by Google

On the face of the meter, in large white figures, is indicated the fare to be paid. The extra fare for additional passengers or extras is also clearly indicated on the meter face. Sets of visible totalizers are placed on the back of the meter to give the cab operator the necessary information concerning total paid miles, total dead miles, number of trips, number of passengers carried, number of extras, total amount of money collected for the day and income per cab-mile.

Portable Hand Grinders



Grinders are equipped with 10 ft. of rubber cable and connector plug for operation from lamp sockets

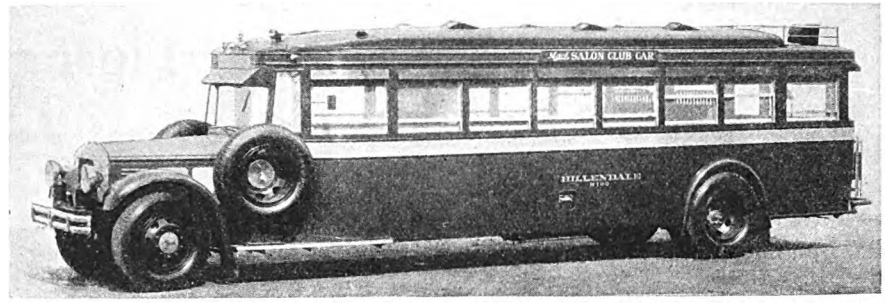
TWO portable hand grinders rated at 1 hp. and 2 hp. capacities, for both direct and alternating-current operation, have been placed on the market by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The motors of these grinders are rated for continuous duty and the mechanical parts are designed for heavy-duty service. They are provided with ball-bearing motors and Timken roller bearing grinding spindles.

The 1-hp. grinder has a no-load speed rating of 3,400 r.p.m., and a net weight of 85 lb. The 2-hp. grinder has a no-load rating of 2,200 r.p.m., and a net weight of 320 lb. The standard equipment consists of grinding wheel, adjustable and approved steel wheel guards, 10 ft. of rubber cable, connector plugs and a suspension spring.

The manufacturer recommends the use of a 2-hp. machine and a 1-hp. machine for economy. When the original 10-in. diameter grinding wheel for the 2-hp. grinder is worn to 8 in., it can be transferred to the 1-hp. machine operating at a higher speed, thereby maintaining the original efficiency.

New Maintenance Contest Begins on Nov. 1

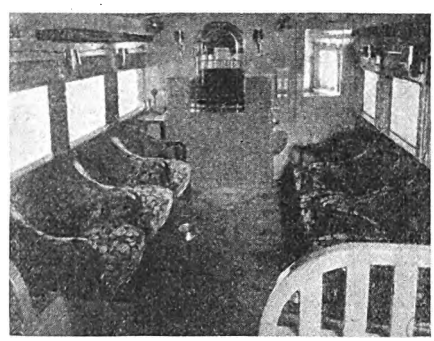
SEE RULES ON PAGE 701



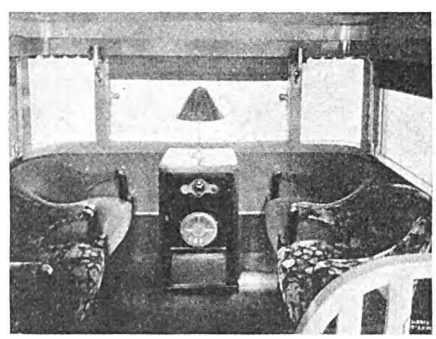
New Mack "salon club car"

Mack "Salon Club Car" Bus Offers Luxury for Long-Distance Travel

DESIGNED for luxury and riding comfort in long-distance travel, a Mack "salon club car," with a capacity of 23 passengers, has been introduced. Radical departures from conventional designs have been made in the seating arrangement and interior equipment. The bus is divided into three sections and the body is mounted on a Mack Model BK chassis.



Luxuriously furnished salon is separated from the driver's section by a bulkhead



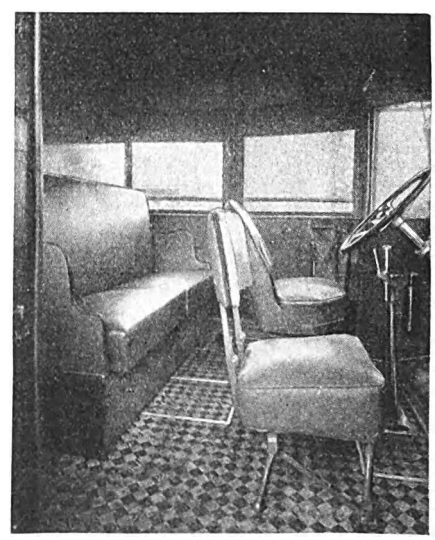
Solarium at the rear contains a radio and heating unit placed in an attractive cabinet

The driving compartment is separated from the passenger section by a built-in bulkhead which materially reduces the sound of the motor. Isolation of the driver and steward from the passengers is thus obtained. Club chairs of the railroad type have been adopted to insure comfort and satisfactory relaxation.

Entrance at the front is through a cabin-lounge, seating five passengers. If necessary, this lounge may be made up into two berths for the crew. A side door leads into the salon which accommodates ten persons. Six of the seats are of the movable club-chair type. Built into the forward bulkhead is a buffet, water cooler and small refrigerator. Luncheon or refreshments may be served by placing small table attachments on each of the arm chairs and by setting up the Pullman tables. These tables may also be used for card playing.

From this middle section, a 16-in. aisle leads between four back-to-back seats, above the wheel-housings, opening into a solarium having four movable club chairs. The solarium contains a radio and a heater, concealed within the radio cabinet. Here the window construction permits an uninterrupted view through both sides and rear.

Windows are equipped with roller screens, keeping out dirt while admitting air. Electric fans and ventilating fans in the rear portion of the roof change the air every 60 seconds.



Front lounge may be converted into berths for the crew

Digitized by Google

Monthly and Other Financial Reports

	Interborough Rapid Transit Co. New York, N. Y.		Steinway Railway New York, N. Y.		Third Avenue Ry. System New York, N. Y.		Metropolitan Railway Paris, France		City of Aberdeen Tramways Aberdeen, Scotland	
	1930[2]	1929[2]	1930[2]	1929[2]	1930[2]	1929[2]	1929[3]	1927[3]	1930[5]	1929[5]
Railway operating revenues	$72,391,867	$69,174,294	$798,749	$830,885	$17,618,580	$17,882,851	413,500,327	386,251,330	£258,308	£248,364
Railway operating expenses	45,401,438	42,344,462	861,613[1]	807,261[1]	14,096,467	14,454,768	281,297,653	242,129,595	207,390	192,693
Net revenue, railway oper	$26,990,429	$26,829,832	.....	.....	$3,522,112	$3,428,082	132,202,674	144,121,735	.....	.....
Taxes	2,522,435	2,393,735	.....	.....	1,155,440	1,154,797	33,840,498[4]	31,946,926[4]	.....	.....
Operating income	$24,467,994	$24,436,097	*$62,864*	$23,624	$2,366,672	$2,273,285	98,362,186	112,174,809	£50,917	£45,670
Non operating income	356,040	561,435	3,870	5,655	298,837	276,900	1,640,271	1,813,627	.....	.....
Gross income	$24,824,034	$24,997,532	*$58,994*	$29,279	$2,665,509	$2,550,185	100,002,457	113,988,436	£50,917	£45,670
Deductions from gross income	24,196,662[6]	19,027,182[6]	63,488	63,962	2,861,528	2,837,254	89,334,170	103,245,940	34,855	33,662
Net income	$627,372	$5,970,350	*$122,482*	*$34,683*	*$196,018*	*$287,069*	10,628,287	10,742,496	£16,061	£15,994
Operating ratio	0.627	0.611	.....	.....	0.800	0.814	0.680	0.627	.....	.....

[1] Including taxes. [2] Year ended June 30. [3] In French francs. [4] Royalty due City of Paris. [5] Year ended May 31. [6] Includes rentals and amounts payable to city under contract No. 3.

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Market Street Railway, San Francisco, Cal.					
September, 1930	745,298	626,770*a*	.....	118,528	64,731
September, 1929	787,449	651,158*a*	.....	136,291	77,378
12 mo. end. Sept., 1930	9,365,644	7,904,409*a*	.....	1,461,235	793,312
12 mo. end. Sept., 1929	9,570,846	8,139,777*a*	.....	1,431,069	710,375
Northwestern Pacific Railroad, Sausalito, Cal.					
August, 1930	638,476	379,655	35,847	222,944	210,115*d*
August, 1929	720,813	474,172	36,539	210,068	201,973*d*
8 mo. end. August, 1930	3,805,872	3,324,630	288,271	192,634	135,092*d*
8 mo. end. August, 1929	4,049,904	3,544,000	302,496	203,072	179,325*d*
Capital Traction Company, Washington, D. C.					
September, 1930	327,713	243,059	25,007	60,389	30,259
September, 1929	330,039	247,256	25,200	58,543	28,342
9 mo. end. Sept., 1930	3,073,934	2,260,967	.....	.....	320,390
9 mo. end. Sept., 1929	3,194,057	2,295,305	.....	.....	396,899
Washington Railway & Electric Co., Washington, D. C.					
12 mo. end. June, 1930	5,638,415	3,571,937	408,171	3,318,092*c*	1,964,409
12 mo. end. June, 1929	5,798,648	3,683,994	450,276	3,180,312*c*	1,775,194
Jacksonville Traction Company, Jacksonville, Fla.					
August, 1930	77,441	69,350	8,827	*1,100*	.....
August, 1929	88,098	81,387	9,332	*2,996*	.....
12 mo. end. Aug., 1930	1,074,576	876,399	105,999	85,927	*68,188*
12 mo. end. Aug., 1929	1,162,859	947,560	107,034	101,982	*56,867*
Honolulu Rapid Transit Co., Honolulu, Hawaii					
August, 1930	86,480	50,902	9,149	27,479	16,326
August, 1929	87,963	51,366	7,975	29,609	18,339
8 mo. end. August, 1930	683,810	408,042	71,455	224,353	131,090
8 mo. end. August, 1929	703,775	403,167	74,236	235,044	145,213
Chicago Surface Lines, Chicago, Ill.					
September, 1930	4,568,564	3,789,472*a*	.....	779,092	.....
September, 1929	5,048,055	4,011,961*a*	.....	1,036,094	.....
Boston Elevated Railway, Boston, Mass.					
August, 1930	2,280,322	1,964,895	148,288	172,827	*531,494*
August, 1929	2,473,665	2,021,243	125,252	332,263	*361,650*
Kansas City Public Service Co., Kansas City, Mo.					
August, 1930	622,554	488,419	41,675	76,980	15,479*b*
August, 1929	717,306	556,639	41,675	118,991	43,123*b*
8 mo. end. August, 1930	5,536,988	4,348,061	333,400	627,124	228,402*b*
8 mo. end. August, 1929	5,949,988	4,493,970	333,400	1,122,617	496,479*b*
Illinois Terminal Railroad, St. Louis, Mo.					
August, 1930	661,520	432,250	34,566	194,675	152,827*d*
August, 1929	716,269	507,518	23,462	185,289	136,270*d*
8 mo. end. August, 1930	5,024,689	3,514,676	234,565	1,275,341	932,973*d*
8 mo. end. August, 1929	5,474,869	3,800,405	187,697	1,486,640	1,106,207*d*
Fonda, Johnstown & Gloversville R.R., Gloversville, N. Y.					
August, 1930	64,592	57,684	4,800	17,376	*12,690*
August, 1929	79,251	60,217	7,840	21,701	*9,300*
8 mo. end. August, 1930	610,217	494,721	38,400	139,553	*109,291*
8 mo. end. August, 1929	672,907	511,706	62,720	188,891	*67,309*
Brooklyn-Manhattan Transit System, New York, N. Y.*e*					
September, 1930	4,834,251	3,113,255	340,176	1,440,564	667,323
September, 1929	4,957,833	3,265,942	350,716	1,407,024	628,452
3 mo. end. Sept., 1930	14,575,451	9,620,058	1,000,955	4,167,964	1,852,769
3 mo. end. Sept., 1929	15,053,385	10,286,538	982,859	3,990,989	1,640,610
Brooklyn & Queens Transit System, New York, N. Y.					
September, 1930	1,887,499	1,446,803	117,468	337,818	213,728
September, 1929	1,979,804	1,533,161	125,086	343,167	219,589
3 mo. end. Sept., 1930	5,631,856	4,428,135	335,285	911,642	538,026
3 mo. end. Sept., 1929	5,975,977	4,757,860	344,138	937,908	564,100
Hudson & Manhattan R.R., New York, N. Y.					
September, 1930	974,433	506,845*a*	.....	467,588	132,332
September, 1929	1,002,525	505,112*a*	.....	497,413	162,732
9 mo. end. Sept., 1930	9,115,430	4,614,702*a*	.....	4,500,728	1,485,893
9 mo. end. Sept., 1929	9,264,632	4,698,250*a*	.....	4,566,382	1,544,005
Long Island Railroad, New York, N. Y.					
August, 1930	3,968,936	2,137,838	497,538	1,333,560	1,152,651*d*
August, 1929	4,186,924	2,316,651	459,374	1,409,949	1,233,931*d*
8 mo. end. August, 1930	26,775,333	17,851,352	2,141,756	6,776,733	5,531,078*d*
8 mo. end. August, 1929	27,769,055	18,180,164	1,977,470	7,596,602	6,336,344*d*
New York Railways, New York, N. Y.					
August, 1930	457,247	408,567	.....	48,680	10,762*a*
August, 1929	537,699	462,590	.....	75,109	13,286*a*
8 mo. end. August, 1930	3,674,872	3,327,412	.....	347,460	24,586*a*
8 mo. end. August, 1929	4,160,976	4,656,868	.....	504,108	17,688*a*
New York, Westchester & Boston R.R., New York, N. Y.					
August, 1930	196,405	125,759	26,420	46,911	*184,982*
August, 1929	219,536	128,879	23,925	67,526	*151,070*
8 mo. end. August, 1930	1,704,903	954,853	203,559	553,503	*1,288,332*
8 mo. end. August, 1929	1,671,155	1,017,382	177,606	482,049	*1,297,381*
Staten Island Rapid Transit Co., New York, N. Y.					
August, 1930	233,371	151,110	17,000	65,316	49,486*d*
August, 1929	271,165	171,506	17,800	81,859	74,894*d*
8 mo. end. August, 1930	1,679,294	1,244,268	137,500	296,009	225,497*d*
8 mo. end. August, 1929	1,749,107	1,336,928	140,800	271,362	221,579*d*
Third Avenue Railway System, New York, N. Y.					
August, 1930	1,350,064	1,088,105	92,748	193,116	*46,540*
August, 1929	1,434,607	1,190,080	94,637	174,225	*64,945*
2 mo. end. August, 1930	2,779,795	2,204,836	188,328	434,573	*44,478*
2 mo. end. August, 1929	2,942,468	2,418,675	192,107	380,391	*97,421*
Philadelphia & Western Ry., Norristown, Pa.					
August, 1930	47,889	.....	.....	.....	*1,684*
August, 1929	60,556	.....	.....	.....	12,061
8 mo. end. August, 1930	450,787	.....	.....	.....	37,876
8 mo. end. August, 1929	520,795	.....	.....	.....	89,847
Memphis Street Railway, Memphis, Tenn.					
July, 1930	210,185	154,532*a*	.....	55,652	8,871*b*
July, 1929	233,113	171,313*a*	.....	61,810	17,576*b*
12 mo. end. July, 1930	2,833,509	1,914,679*a*	.....	919,561	378,970*b*
12 mo. end. July, 1929	2,924,380	1,992,939*a*	.....	934,435	412,054*b*
Galveston-Houston Electric Ry., Houston, Texas					
August, 1930	47,425	25,871	2,531	19,021	.....
August, 1929	53,563	28,322	2,588	22,652	.....
12 mo. end. Aug., 1930	529,519	308,930	32,524	188,256	*82,135*
12 mo. end. Aug., 1929	605,660	336,470	31,849	237,340	*83,350*
Houston Electric Company, Houston, Texas					
August, 1930	244,033	155,710	21,742	66,579	.....
August, 1929	278,581	172,479	26,681	79,420	.....
12 mo. end. Aug., 1930	3,195,078	2,009,693	250,455	951,448	573,872
12 mo. end. Aug., 1929	3,384,034	2,095,336	288,724	1,002,838	598,891
Calgary Municipal Railway, Calgary, Alta.					
8 mo. end. August, 1930	660,373	420,321	.....	240,052	27,860
8 mo. end. August, 1929	.....	.....	.....	.....	50,574
Edmonton Radial Railway, Edmonton, Alta.					
August, 1930	55,330	43,449	.....	11,880	*6,316*
August, 1929	58,582	44,398	.....	14,183	*5,164*
8 mo. end. August, 1930	545,834	367,291	.....	178,543	*4,934*
8 mo. end. August, 1929	559,974	358,508	.....	201,466	9,681
British Columbia Electric Ry., Vancouver, B. C.					
July, 1930	1,196,239	791,431	.....	404,808	.....
July, 1929	1,156,720	786,085	.....	370,635	.....
August, 1930	1,194,390	645,156*a*	.....	549,234	.....
August, 1929	1,168,753	642,308*a*	.....	526,445	.....
2 mo. end. August, 1930	2,390,629	1,285,921*a*	.....	1,104,708	.....
2 mo. end. August, 1929	2,325,473	1,281,764*a*	.....	1,043,709	.....
Regina Municipal Railway, Regina, Sask.					
8 mo. end. August, 1930	271,982	188,258	.....	83,724	*39,657*
8 mo. end. August, 1929	.....	.....	.....	.....	13,616

Italic figures indicate deficit. *a* Includes taxes. *b* Before depreciation. *c* Includes net revenue of Potomac Electric Power Co. *d* Net after rents. *e* Including Brooklyn & Queens Transit System.

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Rockford, Ill.—A. P. Lewis of the Rockford Electric Company has indicated that new trolley buses will be operating here by Dec. 1. The new buses will supplant street cars on the North Church and North Main Street lines, the Harlem Boulevard and connecting routes.

✦

Vancouver, B. C.—The Prince George City Council has tentatively approved an agreement under which the Canadian National Railway will be supplied with electric power from the municipally owned plant for five years, on a sliding scale.

✦

Boston, Mass.—Boston, Revere Beach & Lynn Railroad stockholders have approved a plan to issue $2,200,000 of bonds, the proceeds to be used to retire $1,000,000 of 4½'s at 103 and $1,000,000 of 6's at 102.

✦

St. Louis, Mo.—The St. Louis Public Service Company is operating one-man cars on its Southampton line. For this service 40 cars were rebuilt and equipped with automatic doors, electric heaters and leather-faced seats. The cars have pedal control. With an increase in the number of cars the time between cars has been cut to 1½ minutes during the rush hours and to 4½ minutes in non-rush periods.

✦

Trenton, N. J.—The State Board of Public Utility Commissioners has approved the application of Public Service Co-ordinated Transport to operate twelve additional buses between West Orange and Newark, and Public Service Interstate Transportation Company to operate ten extra buses between Orange and Newark.

✦

Louisville, Ky.—By resolution adopted on Oct. 15 a committee composed of John Stites and Charles A. Heuser is to inquire into any additional economies which seem advisable for Louisville Railway and report at the next meeting with recommendations for any eliminations or reductions regarded as possible without impairing company efficiency. A resolution was also endorsed by the directors ordering $100,000 to be paid on $600,000 of demand notes at the local banks, to reduce indebtedness and lessen interest charges. Meanwhile, action on dividends has been deferred.

✦

St. Louis, Mo.—President Neun, of the Board of Aldermen, St. Louis, Mo., on Oct. 10 referred to a joint aldermanic committee the report of the transportation survey commission which contained recommendations for the improvement of mass transportation in St. Louis. Mr. Neun urged the joint committee to study the report carefully and submit such legislative measures to the entire board as deemed advisable to carry out the recommendations of the commission.

(*Late News Continued on Page* 116)

Association Affairs Reviewed by Executive Committee

Financial Affairs in Good Shape. Committee on Financing of New Cars to Be Appointed. Cleveland Railway Accepts Journal's Maintenance Plaque

MANY phases of the work of the American Electric Railway Association were discussed at an executive committee meeting held in New York on Oct. 10. The report of the committee on policy, presented by G. A. Richardson, chairman, recommended that no definite action be taken at this time concerning the plan of having exhibits in alternate years at A.E.R.A. conventions. The policy committee also recommended the appointment of a committee on car financing. Both recommendations were approved by the executive committee. Work of the publicity committee was outlined by Labert St. Clair in the absence of Barron Collier, chairman. At the request of Col. J. H. Alexander, chairman of the membership committee, its report was presented by F. C. J. Dell.

Details of the financial status of the association were presented by F. W. Doolittle, chairman of the finance committee. He stated that due to careful management and certain fortuitous circumstances, the financial status was better than had been anticipated. The committee recommended the continuance of the present 10 per cent reduction from the regular schedule of dues. This was approved by the executive committee.

Reporting for the committee on national relations, C. D. Cass, general counsel of the association, spoke of the recommendations of the National Association of Motor Bus Owners on the subject of interstate bus regulation. The executive committee indorsed the resolution of that association. W. E. Wood, chairman publications committee, said efforts made to secure wider distribution of *Aera* had not met with marked success, and that the publication committee was planning to hold a meeting in the near future to consider this problem.

Advantages resulting from the work of the committee on insurance were outlined by H. B. Potter, chairman. He pointed out that the rate reduction made by the stock fire insurance companies through the work of the committee had resulted in an annual saving to the industry greater than the annual expense of running the association.

Charles Gordon, managing director, spoke briefly of his recent activities. He said that studies made by the association had developed the fact that travel by auto was 23 times as hazardous as travel by trolley on the basis of fatalities per passenger-mile. Mention was made of the work of the presidents' conference committee, and Mr.

(*Continued on Page* 717)

COMING MEETINGS

Oct. 29-30—Iowa Electric Railway Association, Des Moines, Iowa.

Nov. 12-15—National Association of Railroad and Public Utility Commissioners, annual meeting, Charleston, S. C.

Indianapolis Deposits Satisfactory

Security deposits for the proposed reorganization of the Indianapolis Street Railway is proceeding at a satisfactory rate. Secretary Wichmann of the committee representing owners of the Citizens' Street Railroad 40-year 5 per cent bonds reported 70 per cent surrendered with no withdrawals. John P. Collett, secretary of the group holding Indianapolis Street Railway preferred stock, declared that more than 30 per cent of this stock had already been surrendered and that deposits of large blocks are assured. Approximately 50 per cent of the bonds of the Indianapolis Traction & Terminal Company have been deposited. Plans for the reorganization of the railway and the sale of its properties to two new corporations with approximately $9,700,000 of new money for rehabilitation being supplied by the Midland United Company, an Insull organization, were announced in the ELECTRIC RAILWAY JOURNAL NEWS for Oct. 11.

More Time for Chicago Acceptance

The Chicago City Council is to consider an extension of the date before which the merged transportation company must accept the new co-ordination franchise. To this end the local transportation committee of the council has recommended that the time limit be put forward until Jan. 31, 1931. The date set in the ordinance is Oct. 31, but it was agreed that the consolidation could not be effected by that time. The date proposed on behalf of the companies is between March 10 and 15 of next year. Representatives of every class of security except one have agreed to the merger. This exception is the representatives of the capital stock of the Chicago Railways, the west and north side surface lines, now in the hands of receivers, thus adding a technical complication but one not expected to militate against the consummation of the plan.

Digitized by Google

LATE NEWS

(*Continued from Page 715*)

Decatur, Ill.—The Illinois Commerce Commission has authorized the Illinois Power & Light Corporation to supplant the last of its street cars in Jacksonville with bus service, and has on file an application of the company for permission to make a similar change of service over four routes in Decatur.

✦

Columbus, Ohio—Tracks, cars and substation generator equipment of the Scioto Valley Traction Company have been purchased by the Joseph Schonthal Company, Columbus. There is, in all, 75 miles of track, extending from Columbus to Chillicothe, and from Columbus to Lancaster. Service over the line has already been withdrawn.

✦

New York, N. Y.—Continuance of the hearings on the proposed removal of the Sixth Avenue elevated line of the Manhattan Railway has been postponed to Nov. 3 by the Transit Commission.

✦

Newark, N. J.—Public Service Coordinated Transport, suffered a net loss from operations for first nine months of 1930 of $1,757,289, against profit in same period of 1929 of $305,832, E. A. Tuson, general auditor of company testified before Board of Public Utility Commissioners.

✦

Indianapolis, Ind.—Authority to spend $42,200 for track improvements at two major downtown street intersections in Indianapolis has been granted the receiver of the Indianapolis Street Railway Company by Judge Chamberlain of the Marion Circuit Court. At the same time, the court approved expenditures totaling $255,500 for other track improvements made during recent months. The court stipulated that all such improvements be made out of the current revenue, being opposed to the issuance of receiver's certificates.

✦

New York, N. Y.—Progress on the construction of the city's new subway lines, especially on the shops and yards at 207th Street, reported as 97 per cent complete, appear to insure the opening of the main line of the system under Eighth Avenue in Manhattan in the early Fall of 1931. Initial operation on this line is to be from Fulton and Church Streets to 207th Street.

✦

Erie, Pa.—The Erie Railways plans to substitute bus for trolley service between Erie and Wesleyville, through its subsidiary, the Erie Coach Company, if the Public Service Commission approves.

✦

Dallas, Tex.—Of the $1,373,000 set aside by the Dallas Railway & Terminal Company for the extension and improvement of its property for the current year, $605,000 will be spent in constructing a new viaduct across Trinity River. This work was started recently in accord with an agreement made with the city seventeen years ago. Included in the improvement program were track re-arrangements, purchase of seventeen new cars, the rebuilding of fourteen old cars and the paving of right-of-way on several streets.

The Business Outlook

FUNDAMENTAL though blind forces of human needs are again slowly laying the basis for future recovery since consumption eats steadily into supplies as industrial production lags. Even in building there are clear signs of revival in residential construction. Commodity prices in recent weeks have tended to hold up against the deflation process still under way in securities. As these particular forces become more apparent, business is realizing the necessity of aggressive individual action from the bottom.—*The Business Week.*

Boston, Mass.—Railway and bus fares were reduced materially on Oct. 26 in Reading, Wakefield, Andover, Wilmington and Tewksbury by the Eastern Massachusetts Street Railway. The fares situation in those towns had become unsatisfactory because the zoning system created a number of overlapping fare districts resulting in double fares over some short runs.

✦

Brooklyn, N. Y.—The Transit Commission's service bureau, after a check, reported that while the Brooklyn & Queens Transit Corporation had added more cars when it changed service on the Graham Avenue line from two-man to one-man operation, there were long intervals at times between cars. The cars used in the change were remodeled Brooklyn City Railroad cars, equipped with all required safety devices, but they did not have the treadle step and turnstile fare collector to speed up loading and unloading. This lack is blamed by experts for failure of the one-man system to succeed on this line, one of eight included in the wholesale application of the corporation for conversion to the one-man type last summer.

"Don't Forget, You Pick Up Both of Them"

Memphis Commercial Appeal

Chicago, Ill.—The Government has filed suit to restrain or enjoin the Chicago, North Shore & Milwaukee Railroad from further issuing of securities without first applying for authority from the Interstate Commerce Commission. The petition was filed by Assistant United States District Attorney Joseph A. Struett in United States District Court and alleges that since June 8, 1923, the railroad has issued $42,000,000 in securities without first obtaining consent of the I.C.C. Federal against state authority is at issue.

✦

Dallas, Tex.—Removal of tracks of the Dallas Railway & Terminal Company on South Akard Street and substitution of bus service at the regular car fare has been decided upon by city officials. The Akard line has long been a drag on the rest of the system.

✦

New York, N. Y.—Resolutions expressing opposition to the continuance of the Delaney plan of financing construction of the new city subway system has been adopted by the Merchants Association and also by a group of leaders in several civic organizations, meeting at the Chamber of Commerce of the State of New York. The resolutions urged that the present method of financing the subway work by short-term securities be discontinued and that a policy of issuing long-term bonds be adopted instead.

✦

Hartford, Conn.—The Connecticut Company has been authorized by the Public Utilities Commission to operate bus service in part in substitution for trolley service between Bloomfield and Hartford. Limited trolley service will be afforded residents of Rockwell's Corner on the Blue Hills Avenue line.

✦

St. Louis, Mo.—The St. Louis Public Service Company is installing electric heaters on its cars as quickly as the financial condition of the company will permit. At the present time about 70 cars on the system are so heated. In its final report, the St. Louis transportation survey commission recommended that 800 new cars, electrically heated, be bought, and that the remaining cars on the St. Louis system be equipped with electric heaters as part of the work to be done by the company under a proposed new franchise deal.

✦

Lowell, Mass.—The Eastern Massachusetts Street Railway plans complete substitution of buses for all trolley lines here. No major track replacements will be attempted, trolleys on some lines to be used only through the remaining life of the rails.

✦

Warren, Pa.—The West Ridge Transportation Company, which nearly a year ago acquired the Warren Street Railway, discontinued operation of trolleys on Oct. 18. Buses have been placed in service on former trolley routes and a number of new routes have been established. In starting the bus service, the company carried passengers free of charge the first two days. The Warren Street Railway began operations in 1893. In 1903 interests identified with it formed the Warren & Jamestown Street Railway to operate between Warren, Pa., and Jamestown, N. Y. On Dec. 3, 1929, buses of the West Ridge Transportation Company supplanted the interurban railway service.

Digitized by Google

Weekly Pass in Portland, Ore.

Weekly passes, to be sold for $1.25 and to be good for any number of rides by any holder, will be instituted by the Pacific Northwest Public Service Company at Portland, Ore., on Nov. 1, or as soon thereafter as details can be arranged. Decision to adopt this change was reached on Oct. 18 at a conference of railway officials with the Oregon Public Service Commission.

The change is to be made at the request of the commission as an experiment. The new rate will be in effect until the close of the year. If the pass system by that time has popularized street car riding enough to increase the company's revenues it will be continued.

A 10-cent cash fare has been in effect since March 6.

Segregation of the railway lines has been a matter of discussion for some time.

Association Affairs Reviewed

(*Continued from page* 715)

Gordon was formally authorized to serve as secretary of this committee. Professor Hirshfeld, chief engineer of the presidents' conference committee, was presented to the members of the executive committee.

President J. H. Hanna presented the annual company award in ELECTRIC RAILWAY JOURNAL Maintenance Contest to Col.

Another Trophy for the Cleveland Railway

J. H. Alexander, president of the Cleveland Railway. Ordinarily this presentation would have been made at the annual convention of the association, but this year the convention was held prior to the conclusion of the contest. In accepting the award, Colonel Alexander expressed his gratification at the success of the Cleveland Railway.

After luncheon, the members of the executive committee heard Hawley Simpson, research engineer A.E.R.A., tell about the growth of the use of private automobiles in the United States. Charts showed that the rate of increase has been arrested. He predicted that the effect of the private automobile upon public transportation had reached its maximum and that this form of competition was unlikely to become more serious in the future than it has been in the past.

Nov. 21 was tentatively selected as the next date for a meeting of the executive committee.

Mid-West Association Plans Equipment Men's Division

A FORWARD-LOOKING step of considerable interest featured the eighth annual meeting of the Mid-West Electric Railway Association held in Miami, Okla., Oct. 9, 10 and 11, when, without a dissenting voice, it was decided to organize within the association an equipment men's division where mechanical department employees could foregather semi-annually for a detailed discussion and comparison of the equipment performance records of their respective railway properties.

Particular attention, also, was paid to the subject of modern mass transportation vehicles. The trolley bus, especially, came in for a great deal of discussion. Pointing out that the trolley bus is not a new development; that 30 years ago it was in use in Europe, and some ten years ago was introduced to North America, F. M. Peters, Chicago district manager, transportation department, General Electric Company, presented two moving picture reels showing the operation of the Salt Lake City and the more recent Chicago trolley bus installations.

H. S. Robertson, presiding over the Thursday and Friday sessions, called attention to the unprecedented competition which many businesses, other than the electric railways, face. Changing conditions may make it necessary, he said, to revise financial structures of existing railway properties; to effect alterations in physical layouts by abandonments, reroutings, new equipment, co-ordination of bus and trolley bus operations, and revision of schedules and headways. In fact, Mr. Robertson concluded, research and study alone must determine what is best suited to meet the situation.

In discussing factors vital to the satisfactory operation of electric railways in cities of 85,000 population and less, F. J. Johnson, railway engineer St. Joseph Railway, Light, Heat & Power Company, stressed modernization, including not only the operation of up-to-date equipment, but also a modern financial structure, modern rates, a modern franchise, and modern service. Equally important, Mr. Johnson urged, was the need for an intensive merchandising. Finally, he urged a careful analysis of operating expenses to the end that economies in numerous small items might be made sufficient to spell the difference between profit and loss.

The Hon. John E. Curtiss, former chairman of the Nebraska State Railway Commission, defended the regulatory commissions, but declared that the interests of the people were generally best served when enlightened managements were allowed a comparatively free hand in working out solutions to the perplexing problems confronting the utilities.

In a paper prepared by S. B. Cooper, manager, general engineering department, Westinghouse Electric & Manufacturing Company, George Gillespie, Kansas City representative of the company, reviewed the progress which has been made in developing equipment for present-day operating requirements.

Claim settlements and the defense of lawsuits were subjects covered by A. T. Bagley, general claims assistant Kansas City Public Service Company. Mr. Bagley reviewed the campaign his own company has been conducting for several months against the practices of "ambulance chasing" lawyers. The change in claim policy has been directed toward cutting down the number of lawsuits, and contemplates, determining if it is not cheaper to dispose of all doubtful liability claims immediately.

In a paper dealing with the solicitation of claims, G. T. Hellmuth, general claims attorney Chicago, North Shore & Milwaukee Railroad, stressed the avoidance of accidents through the more careful selection of trainmen. "Having once chosen our trainmen," continued Mr. Hellmuth, "the next problem is that of training them. We all know how to train new men—at least I assume that we are all readers of *Aera,* ELECTRIC RAILWAY JOURNAL, and the proceedings of the American Electric Railway Association, all of which in the last two or three years have devoted considerable attention to the subject." A third requisite, concluded the speaker, is supervision — constant observation and rigid enforcement of discipline.

As an interesting feature of the first day's session, a first aid demonstration was staged by a five-man team of the Northeast Oklahoma Railroad.

A business session concluded the working program. C. A. Semrad, general manager St. Joseph Railway, Light, Heat & Power Company, was elected president for the forthcoming year; R. P. Woods, Kansas City, Clay County & St. Joseph Railway, was elected first vice-president; and C. W. Gifford, general manager, Des Moines Railway, was elected second vice-president.

Five-Cent Fare to Be Restored in New Jersey

A straight 5-cent community fare on trolley and bus will be restored in New Jersey as soon as mechanical changes can be made in fare boxes. So Thomas N. McCarter, president of the Public Service Co-ordinated Transport, informed the State Board of Public Utilities Commission on Oct. 23. The cash fare now is 10 cents with ten tokens sold for 50 cents.

In a letter to the commissioners Mr. McCarter said:

If the ownership of Transport stood by itself without association with other properties compliance would be economically impossible, but as is well known, Public Service Corporation of New Jersey is the sole owner of the equity of Transport as it is of Public Service Electric & Gas Company, which serves substantially the same portions of the state. It is also well known that despite the difficulties of Transport, Public Service Corporation as a whole is in sound economic condition and though not a utility in the strict sense of the term it is of the highest consequence that it, as the owner of all these properties, should be adequately maintained. In trying out this arrangement we think Public Service is making a substantial contribution to help existing conditions locally. It will be our effort to contribute our share in the development of the state by rendering adequate service in all three of these major utilities. In agreeing to this advanced step we beseech for Transport a continuance of the co-operation of the board, fair treatment by the municipalities and the good will of the public.

Digitized by Google

Electric Railways Win Bus Maintenance Awards

Winners of the national awards given annually to operating companies in the bus industry by *Bus Transportation*, a McGraw-Hill publication, were announced on Sept. 26 in connection with the fourth annual meeting of the National Association of Motor Bus Operators in Chicago. The winners are: In Class A, for companies operating 3,500,000 or more bus-miles annually in revenue service: first award, United Electric Railways, Providence, R. I.; second award, Community Traction Company, Toledo, Ohio.

In Class B, for companies operating 1,000,000 and less than 3,500,000 bus-miles in revenue service: first award, Blue Ridge Transportation Company, of Hagerstown, Md.; second award, Washington Rapid Transit Company, Washington, D. C.

In class C, for companies operating less than 1,000,000 bus-miles annually in revenue service: first award, Groton & Stonington Traction Company, New London, Conn. There was no second award in Class C.

The awards were given this year for the most outstanding examples of progress made in maintenance methods and practices for vehicles operated by motor carriers in the United States and Canada. In all, there are six awards, divided among three classes of companies operating in either city or intercity service. In each classification, the first award is a medal plaque and a certificate, together with the sum of $500 in money. Second prize in each group takes the form of a medal plaque and a certificate.

What's in *News of the Industry*

A.E.R.A. executive committee meets.

Prospects good for appointment of committee on car financing.

Progress reported on Indianapolis reorganization.

More time likely for acceptance of new Chicago grant.

Full service by bus eventually in Lowell.

"Don't Forget, You Pick Up Both of Them."

Portland to try the weekly pass.

Stirring meeting of Mid-West men.

Five-cent fares back in Jersey.

A national institute of traffic engineers.

Mortality laws applied to physical property.

Car riding craze in London.

London again discusses co-ordination.

Winners of bus maintenance awards announced.

Richey's review shows economic trends.

Conspectus of Indexes for October, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years	
				High	Low
Street Railway Fares* 1913 = 4.84	Oct., 1930 **8.01**	Sept., 1930 **7.99**	Oct., 1929 **7.76**	Oct., 1930 **8.01**	Nov., 1925 **7.30**
Electric Railway Materials* 1913 = 100	Oct., 1930 **132.7**	Sept., 1930 **133.0**	Oct., 1929 **145.6**	Dec., 1926 **159.2**	Oct., 1930 **132.7**
Electric Railway Wages* 1913 = 100	Oct., 1930 **231.8**	Sept., 1930 **231.8**	Oct., 1929 **231.1**	Oct., 1930 **231.8**	Oct., 1925 **222.8**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	Oct., 1930 **195.1**	Sept., 1930 **195.6**	Oct., 1929 **203.0**	Nov., 1928 **205.7**	Oct., 1930 **195.1**
General Construction Cost Eng'g News-Record 1913 = 100	Oct., 1930 **198.7**	Sept., 1930 **199.6**	Oct., 1929 **206.3**	Jan., 1927 **211.5**	Oct., 1930 **198.7**
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	Sept., 1930 **84.2**	Aug., 1930 **84.0**	Sept., 1929 **97.5**	Nov., 1925 **104.5**	July, 1930 **84.0**
Wholesale Commodities Bradstreet 1913 = 9.21	Oct., 1930 **10.30**	Sept., 1930 **10.42**	Oct., 1929 **12.70**	Dec., 1925 **14.41**	Oct., 1930 **10.30**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	Sept., 1930 **145.6**	Aug., 1930 **143.7**	Sept., 1929 **160.8**	Nov., 1925 **167.1**	Aug., 1930 **143.7**
Cost of Living Nat. Ind. Conf. Bd. 1914 = 100	Sept., 1930 **152.9**	Aug., 1930 **151.6**	Sept., 1929 **163.2**	Nov., 1925 **171.8**	Aug., 1930 **151.6**
Industrial Activity Elec. World, kw.-hr. used 1923-25 = 100	Sept., 1930 **110.7**	Aug., 1930 **105.3**	Sept., 1929 **135.8**	Feb., 1929 **140.4**	Sept., 1925 **98.1**
Bank Clearings Outside N. Y. City 1926 = 100	Sept., 1930 **82.7**	Aug., 1930 **86.9**	Sept., 1929 **109.8**	Oct., 1929 **111.8**	Sept., 1930 **82.7**
Business Failures Number	Sept., 1930 1763	Aug., 1930 1630	Sept., 1929 1318	June, 1930 1874	Sept., 1928 1348
Liabilities, Millions of Dollars	**56.56**	**57.06**	**27.75**	**114.40**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

BOOK REVIEWS

Development of Oil Circuit Breakers

"High Voltage Oil Circuit Breakers," by Roy Wilkins, consulting engineer Pacific Electric Manufacturing Company and E. A. Crellin, assistant engineer Pacific Gas & Electric Company, with an introduction by J. P. Jollyman. 301 pages, 119 illustrations. Published by the McGraw-Hill Book Company, New York, 1930. $4.

In this volume is given a complete history of the development of the high voltage oil circuit breaker, a discussion of the theory of its action, descriptions of modern forms, and an account of the results of many field tests.

Electrical Distribution

"Electrical Distribution Engineering," by Howard P. Seelye, Engineering Division, Detroit Edison Company. 710 pages, illustrated with 394 diagrams. McGraw-Hill Book Company, New York, 1930. $6.

This book is a comprehensive treatment of electrical distribution system design, including essentials of electrical and civil engineering and economics necessary to a knowledge of the subject. The principles are shown in their relation to the solution of practical problems. Many tables and data for reference are included.

A Technical Dictionary in Three Languages

Techno-Dictionary, English-German-Italian. 410 pages 4x6 in. Published by Hubert Hermanns, Berlin-Lichterfelde, Germany. $3.75.

For the readers of foreign technical periodicals the author has compiled this dictionary, which is a collection of technical terms for metallurgical, foundry, factory and workshop practice. There are three separate sections for the three languages translated. Following the word in the language of the section are given the definitions in the other two languages. No attempt is made to make this a general translation dictionary, but the author has endeavored to collect the largest possible number of terms as found in reading foreign technical periodicals and books. Approximately 4,000 to 5,000 words are translated from each of the three languages into the other two.

Mortality Laws Applied to Physical Property

"Life Expectancy of Physical Property Based on Mortality Laws," by Edwin B. Kurtz, head of department of electrical engineering State University of Iowa. Published by the Ronald Press Company, New York. 205 pages, 90 charts, 60 tables. $6.

While depreciation of physical property has, from time to time, been considered as a mathematical problem and formulas have been presented, it is seldom that the subject has been attacked from a scientific basis. In this book the author has applied to the life problems of physical property—structures, machinery, equipment, etc., the principles and methods which have been used by life insurance actuaries in dealing with the problems of human mortality. The author has collected an immense amount of material and has drawn off life experience of many engineering structures as a basis for determing a logical method of anticipating life of property.

Digitized by Google

Unified Public Control for London Transport Services

THE British transport minister, Herbert Morrison, has recently met in successive conference representatives of the various transport organizations serving London and suburbs including the London General Omnibus Company, the London Underground Railway, the Metropolitan Railway, the various municipal railway organizations, and the four main-line railroads of Britain. It is intended to proceed at once to open discussions following a study undertaken by Sir William McLintock, famous accountant.

Co-ordination of the undertakings engaged in passenger transport in the London district has been recommended in varying forms by successive commissions and committees, notably the London and Home Counties traffic committee in 1927. When he assumed office this subject formed one of Mr. Morrison's first preoccupations.

In a statement made in the House of Commons some time ago, he outlined the Government's ideas for dealing with the London traffic question. The sum and substance of Mr. Morrison's statement amounts to this:

No lasting solution will be found unless further steps are taken towards eliminating uneconomic and unnecessary competition. A far-reaching measure of unification under public control is essential. The object must be to bring about, so far as possible, a co-ordinated system of passenger transport so managed that earnings shall be sufficient to meet all proper charges, including reasonable remuneration of capital. The Government has concluded that the ends in view can be fully achieved and that the public interest can be fully safeguarded only if existing sectional financial interests are consolidated by the substitution of a single and simple form of public ownership. The Government will proceed to explore with all the interests concerned and with the assistance of an eminent chartered accountant, a plan for the complete consolidation on fair and equitable terms of the agencies now providing services by omnibuses, by tramways and by local railways. All the municipal interests should be included. While the Government has decided that the principle of public ownership should be applied, its aim will be to assert and effectively to provide for the principal of commercial management of a self-supporting consolidated transport system. In this way no liability need be entailed on public funds or public credit.

In planning the transfer of these transport services to public ownership the Government is not taking a leap in the dark. Already Parliament has recognized the necessity in many cases of entrusting essential national or local services to public bodies of this nature, such as the Port of London Authority, the Metropolitan Water Board, and the Central Electricity Board.

Mr. Morrison started with a bias in favor of a joint municipal body representative of the local authorities in the area, but in the end he concluded that this would be inappropriate. Further, his own experience of serving on local authorities showed him that there was too much "joint" and not enough "authority" about them.

The Government, therefore, aims at combining business-like management with public ownership by the creation of a small board consisting of persons of proved business capacity. Every effort will be made to secure the services of a chairman who combines business acumen and vigor with wide knowledge and experience, and who can be trusted to ensure that the appointment of officers of the board will be governed by considerations of efficiency. The board will be such as will command the confidence both of the investing public and of the users of transport in London. It will function as much as possible free from political interference so far as questions of management are concerned.

Mr. Morrison is anxious to utilize the experience and abilities which exist in the present undertakings, and it is likely that Lord Ashfield, charman of the London Underground combine, will be offered the chairmanship of the board.

The new authority's transport policy will be determined by technical fact and public interest. In this connection, it is interesting to note that, upon its advent to office, the present Government was successful in securing the rejection of the merger, under private control, of the Underground Railways, London General Omnibus Company, and the London County Council Tramways, which was on the point of receiving Parliamentary sanction.

The capital of the London traffic undertakings totals £113,052,023 ($565,260,115). The board will become responsible for services on which last year 4,000,000,000 journeys were made. The returns of passengers in 1929 in the Greater London area gave the following totals:

	Number	Per Cent
Tube railways.....	961,978,475	24.4
Street railways.....	1,076,250,997	27.3
Buses	1,912,092,980	48.3

The aggregate represented an increase of 51,195,852, compared with 1928. The London General Omnibus Company operates a fleet of 4,600 vehicles. It is closely linked with the London Underground combine.

No Material Changes Recommended for Liverpool

Fourteen months ago, Sir Henry Maybury was requested by the corporation to investigate and report upon traffic conditions in Liverpool with particular reference to the respective merits of street cars and buses. The most interesting of Sir Henry's conclusions is his vindication of the street railway system, which covers 167 miles and which he regards as "an excellent investment, capable of serving the Liverpool public extremely well for many years and of earning large sums of money for the rate-payers." Since the improvement of the cars has not kept pace with the maintenance of the track and with the demand for increased comfort and travel, Sir Henry suggests introduction of bogie cars capable of a much higher speed. In London, he declares, the maintenance of a higher standard of comfort and efficiency has enabled street railways to increase their traffic, and he predicts a similar result in Liverpool, if the rolling stock is modernized without delay. Sir Henry also says the cost of operating a well-organized and well-managed railway amid a considerable potential traveling population is probably lower per seat-mile than is the case with any other passenger vehicle, save perhaps the trolley bus. Nevertheless, he believes future needs should be met by augmenting the bus fleet. He is opposed to the construction of a subway system in Liverpool and sees no benefit from the suggestion for linking up the street railways with the Liverpool Overhead Railway.

A Remarkable Recovery at Glasgow

The statement of accounts of Glasgow Corporation Tramways for the year ended May 31 shows a wonderful improvement in finances. In former years this was a highly prosperous system, but for some time back it has recorded deficits owing to keen and growing bus competition. For the year ended May 31, 1929, there was a deficit of £85,222. This has now, for the twelve months ended May last, been changed to a surplus of £8,136. The deficit and surplus are arrived at after charging, in addition to working expenses, interest on capital, sinking fund, large allowances for renewals and depreciation, and other deductions.

It is to be noted that the last-mentioned allowances are about £70,000 less than those for the year before. Despite that, however, the traffic receipts are up £33,000. The improved revenue is largely attributed to the adoption of more comfortable cars equipped with more powerful motors giving higher car speed. The system generally has been tuned up. The city authorities have recently obtained powers to restrict unlimited bus competition, and if a bill which they now have before Parliament is passed, the municipality will obtain a monopoly of public passenger transport over tramway routes within the city. The corporation is also rapidly developing its own bus services.

New Light-Weight Cars Tested in Birmingham

Birmingham is experimenting with all three forms of transport. A few months ago, buses of the roomy, luxurious type, recently introduced in London, replaced a rail service, while in another district the trackless trolley has superseded the railway. Birmingham still has a strong street railway system under the control of the municipal corporation, the transport department of which is now testing out two new street cars of a lighter type than hitherto operated. By the use of duralumin and aluminum parts in construction a considerable reduction has been effected in the weight of the cars and operation has been cheapened. Transverse and reversible seating in leather and moquette is provided for 60 passengers.

London Catches the Car Riding Craze

The American freak cult of "tree-sitting" has a parallel in London, where travelers are car-riding for freak records. The craze has sprung up as a result of the popularity of the London County Council system's "shilling-all-day" tickets, which entitle the passenger to ride as often and wherever he wishes on any Council street car. The endurance record is at present held by James Kardux. With an all-day ticket he traveled 183½ miles in 21 hours 20 minutes. He rode in 57 street cars, starting at 5:20 a.m. and finishing late on the next day. His longest trip in one car was 30 miles. The ordinary fares would have totaled $2.87, whereas his shilling (24-cent) ticket defrayed the entire cost. Mr. Kardux broke a previous record of 175 miles.

Digitized by Google

PERSONAL MENTION

Messrs. Ingle and Moore Advanced in Jacksonville

Officials of Florida Company Advanced in Recognition of Their Long and Valuable Services. Mr. Ingle at Jacksonville Since 1922

JOHN P. INGLE, manager of the Jacksonville Traction Company, Jacksonville, Fla., has been made president of the company, and B. H. Moore, assistant treasurer, has been named treasurer. The new president will remain manager, and the company will follow its present operating policies. Mr. Ingle succeeded Donald C. Barnes, of Boston, as president. Mr. Moore's predecessor was Henry B. Sawyer, also of Boston. No other changes in the personnel of the company were made.

Mr. Ingle has been manager of the company since 1922, when he went to Jacksonville from Haverhill, Mass. Mr. Moore went to Jacksonville in March, 1928, from Boston, where he had been attached to the auditing division of Stone & Webster, Inc., operators of the Jacksonville railway system.

Every once in a while an editor finds that his work has been done for him by some one else. The occasions are infrequent, but such instances do occur. The present is one of them. If ever a man was bisected and dissected then John P. Ingle is so treated in the following accurate appraisal of the man, culled from a source not clearly identified but none the less accurate:

> Even the radical chaps who hate public service corporations as inventions of the devil designed solely to steal the rights of the people and directed by men who are two-thirds Machiavelli and one-third Mussolini admit that John P. Ingle is a regular fellow.
>
> Urbane and smiling always, whether in friendly intercourse or forensic tilt, he is as ready to plunge instantly into defense of a cause of a friend as he is to strike lusty blows in pushing his own battles. The sobriquet "happy warrior" might well be borrowed and fitted to this manager of the Jacksonville Traction Company.
>
> Few men in Jacksonville have engaged in such gusty controversies as John P. Ingle. None other has left behind so little personal bitterness and so few personal enemies.
>
> John P. Ingle has a genius for fighting hard and long for a cause, an issue or an ideal without letting the struggle descend to personalities. He manages to be charmingly inoffensive and friendly even when his carefully marshalled logic is destroying his opponent's case.
>
> Because of his limitless tact and his ability, he has the affectionate personal regard even of those who oppose in principle the interests he represents. This public impression of the man is only one facet of his character, but it reflects traits that appear again in other phases of his business activity.
>
> If you want to know about a man, ask his relatives or his employees. If you want to knew about John P. Ingle, ask the employees of the Jacksonville Traction Company. Ask in a friendly way, too, because there's a fair chance you'll find trouble if you act as though you don't like him. The answer to your question will warm the cockles of your heart with its enthusiastic, hearty man-affection for a regular fellow.

John Pierce Ingle was born in Salisbury, Md., in October, 1882. He spent his boyhood in Atlanta and attended the public schools of that city. Ambitious to study engineering, he entered the Georgia School of Technology and was graduated in 1906 as a bachelor of science in civil engineering.

On leaving school he at once became associated with Stone & Webster, Inc. His first major assignment was to the assistant superintendency of the Columbus Gas Company, Columbus, Ga.

His talents for making friends and solving difficult public utility problems soon won him recognition and he was promoted again, this time to the superintendency of the gas department of the Baton Rouge, La., Electric Company.

J. P. Ingle

His next step was to Keokuk, Iowa, as manager of the Keokuk Electric Company. Then he was transferred to Haverhill, Mass., as manager of the Haverhill Gas Light Company. In July, 1922, Mr. Ingle was sent to Jacksonville as manager. Just now the company of which he is the head is negotiating with the city for a new franchise.

J. S. Thorp in New Lackawanna Post

James S. Thorp, since September, 1928, electric traction engineer of the Delaware, Lackawanna & Western Railroad, has been appointed electrical engineer of that company. Previously he was assistant electrical engineer on the Illinois Central electrification. Mr. Thorp has had wide experience in steam and electric railway service. He has been connected with the electrification of the New Haven, the Norfolk & Western and the Victorian Railways of Australia. He was graduated from Virginia Polytechnic Institute in mechanical and electrical engineering, class of 1910.

Appointments Presage Intensive Traffic Development

Announcement of the appointment of E. B. Smith as general freight and passenger agent, and W. R. Hickrod as superintendent of transportation, and the placing in effect of new schedule in the interest of improved freight transportation has been made by E. L. Moore, general superintendent of the Evansville & Ohio Valley Railway, operating railway and bus lines at Evansville, Ind.

Mr. Smith assumes the post of general freight and passenger agent after four years with the Chicago & Eastern Illinois Railroad freight department. A native of Evansville, he was formerly with Servel, Inc., traffic department, and as road representative of the Fisk Tire & Rubber company.

Mr. Hickrod, has spent the greater part of his business years in Evansville & Ohio Valley service. Starting in as conductor in 1905, he served in this capacity for eight years. Up to his most recent promotion to superintendent of transportation, he had operated the dispatcher's office since 1913.

The company has established freight pick-up trucking service between Evansville and Mount Vernon, Ind., insuring daily deliveries of merchandise. Orders will be received from merchants in Mount Vernon for merchandise from Evansville supply centers, and store door deliveries will be made, Mr. Moore stated.

Store door freight delivery service has also been started between Evansville and Rockport. Orders for merchandise will be received by the agent at that point. Package express convenience is now available on all cars and buses in both directions at moderate transportation rates.

E. J. Booth Is Made Assistant to President

Edwin J. Booth has been elected assistant to the president of the Chicago, South Shore & South Bend Railroad, South Bend, Ind., according to announcement by Robert M. Feustel, president. Mr. Booth has also been elected assistant to the executive vice-president of the Midland United Company, of which he also is comptroller.

J. H. Pritchard Manager at Lynchburg

J. H. Pritchard, of Chicago, has been appointed manager of Lynchburg Traction & Light Company, Lynchburg, Va., to succeed C. D. Thomas, resigned. Mr. Pritchard will arrive in Lynchburg about Nov. 1. He is a native of eastern Virginia and a graduate of Virginia Polytechnic Institute, where he majored in engineering. He is working at present in the headquarters office of the Central Public Service Company in Chicago which controls the Lynchburg property. At one time he was an engineer for a utility company in St. Joseph, Mo.

Mr. Thomas was manager of Lynchburg Traction & Light Company a little more than one year, taking the place of D. C. Frost at the time of the latter's death. He was assistant to Mr. Frost for several months before being appointed manager.

Digitized by Google

G. M. Dahl Now Factor in Interborough Affairs

ELECTION of Gerhard M. Dahl, chairman of the Brooklyn-Manhattan Transit Corporation, as chairman of the board and of the executive committee of the Interborough Rapid Transit Company, took place early last month. In effect, it makes Mr. Dahl the dominant figure in the city's transit affairs. In addition to

G. M. Dahl

his positions in B.-M. T. and I. R. T., Mr. Dahl also is chairman of the Brooklyn & Queens Transit Corporation, controlled by the B.-M. T., and also heads the Brooklyn Bus Corporation, bus operating subsidiary of the B. & Q. T.

As representative of the Interborough, appointed by the directorate, Mr. Dahl will take part in unification conferences with the city transit authorities. As head of the B.-M. T., he already controls the destinies of that company in unification. For several months Mayor Walker's transit advisers have been discussing a basis for fixing a price to be offered the B.-M.T.

Mr. Dahl and Samuel Untermyer, special counsel for the city in transit matters, already have discussed possibility of forming a quasi-public holding company to take over securities of the two independent companies and operate a unified system, including the city's new lines, scheduled to be ready in the fall of 1931.

Appointment of Mr. Dahl to represent the Interborough in unification discussions also was regarded as a significant development. As the *Wall Street Journal* has pointed out, Interborough management, up to this time, has refused consistently to take part in unification negotiations on the grounds that it could not until its increased fare suits were acted on finally by the courts.

The make-up of the Interborough executive committee indicates the strength of the Dahl group in the company's affairs. On the committee, in addition to Mr. Dahl, are Charles Hayden and Albert H. Wiggin, both of whom were members of the protective committee, formed last March to bring the Interborough into the unification picture. Both Mr. Hayden and Mr. Wiggin also are on the B.-M. T. directorate. Other members of the committee favor unification.

It also is interesting to note that four members of the Interborough executive committee are directors of the Chase National Bank. Frank L. Folk, who is a voting trustee of the Interborough, with Mr. Dahl and Frank Hedley, is also a director of the bank.

Mr. Dahl has had an unusual record of achievement as a lawyer, as an executive and as a financier.

Memorial Fountain for Late M. L. Harry

Formal dedication of the M. L. Harry memorial fountain at Decatur, Ill., was made on Sept. 6. The fountain was a gift to the city by a group of friends of the late M. L. Harry, who felt that the memory of a man who had meant so much to the community in which he lived deserved to be preserved by some tangible token. To present this worthy memorial, this group of friends selected L. E. Fischer, vice-president in charge of operations of North American Light & Power Company, a life-long friend of Mr. Harry's. In a brief impressive presentation talk, Mr. Fischer paid a just tribute to Mr. Harry and explained in behalf of those who made this monument possible, the occasion for the ceremony.

M. L. Harry lived in Decatur for a quarter of a century. His death, as the result of an unfortunate accident, occurred on Oct. 11, 1929, while he was on duty for the Illinois Power & Light Corporation by which he was employed, and in the service of humanity that he loved so much.

Messrs. Burns, Plummer and Brown in New Dallas Posts

W. R. Burns

W. R. BURNS, who has been assistant general manager of the Dallas Railway & Terminal Company, Dallas, Tex., for several years, has been elected vice-president and appointed general manager of the company. He succeeds the late Richard Meriwether. Other appointments announced include that of George I. Plummer and B. R. Brown as assistant general managers in charge of traffic and engineering and construction, respectively. A statement by President John W. Carpenter of the company, in which he eulogized the work of the men who are advanced, says:

B. R. Brown

The company takes pride in being able to fill the top positions in the organization with men who have developed from the ranks. This has been the policy pursued for several years and it has built a spirit of loyalty that has made the local railway system efficient despite decreased patronage and lowered income. This policy will continue and there will always be opportunity for present and future young men employees. This will insure good service to Dallas patrons. In the final analysis, this is what the people are entitled to and which we strive to supply.

Mr. Burns has been closely connected with the operations of the company for

G. I. Plummer

many years. His experience with the company and his previous public service work fit him admirably to be general manager. He has an intimate knowledge of the operating history of the company and has made a close study of its problems. He started in the offices of the Dallas company fifteen years ago as clerk in the accounting department. Several years later he was made assistant secretary-treasurer and subsequently was made assistant general manager. Mr. Burns was born on a farm in Cooke County, near Gainesville. He went to East Texas State Teachers' College at Commerce after he finished at the Cooke County schools.

Mr. Plummer has been with the Dallas

Digitized by Google

company for 24 years. His first job was at the carhouse. He has worked all through the ranks in the traffic department and has seen the Dallas system grow from belt lines to one of the most efficient systems in the country.

Mr. Brown entered the engineering department of the company 21 years ago and has directed construction work on many of the present lines. He has been in charge of the track and line department for many years.

C. D. Emmons, New Hudson & Manhattan Head, Is Honored

One hundred and fifty business executives prominently identified with transportation and associated industries, honored Charles D. Emmons, recently elected president of the Hudson & Manhattan Railroad, operating between New York and New

C. D. Emmons

Jersey under the Hudson River, at a testimonial dinner tendered him on Thursday evening, Oct. 16, at the Lotos Club, New York.

Arthur Brisbane, well known journalist, who contributes the department "Today" to the Hearst papers, was the principal speaker. Others who spoke included Matthew C. Brush, J. H. Hanna, president, Capitol Traction Company, Washington, D. C., and Charles J. Hardy, general counsel, American Car & Foundry Company. Charles C. Castle, vice-president of the American Car & Foundry Company, was toastmaster.

The committee in charge of arrangements for the dinner included: George Le Boutillier, vice-president Pennsylvania Railroad; Matthew C. Brush, president International Corporation; Charles R. Ellicott, vice-president Westinghouse Air Brake Company; Frank Hedley, president Interborough Rapid Transit Company; Frederick Green, Triplex Safety Glass Company; H. Hobart Porter, director B.-M.T. and Hudson & Manhattan Railroad; Charles F. Scott, General Electric Company; Lucius S. Storrs, president United Railways & Electric Company of Baltimore, and William H. Woodin, president American Car & Foundry Company.

Among those who attended the dinner were:

H. H. Vreeland, I.R.T.; W. S. Menden, Brooklyn-Manhattan Transit Corporation; G. W. Jones, Brooklyn-Queens Transit Corporation; W. T. Rossell, Brooklyn-Queens Transit Corporation; F. T. Wood, Fifth Avenue Coach Company; L. H. Palmer, Fifth Avenue Coach Company; H. B. Potter, United Railways & Electric Company, Baltimore; Guy C. Hecker, American Electric Railway Association.

J. V. Davies, Hudson & Manhattan Railroad; C. E. Morgan, Cincinnati Car Corporation; E. C. Faber, of Barron G. Collier Company; F. H. Shepard, Westinghouse Electric & Manufacturing Company; T. R. Langan, Westinghouse Electric & Manufacturing Company; W. M. Wampler, Ellcon Company; E. B. Smith, American Brake Shoe & Foundry Company; T. W. Casey, National Pneumatic Company; C. S. Hawley, Consolidated Car Heating Company; S. J. Cotsworth, Lorain Steel Company; C. B. Keyes, General Electric Company; J. G. Barry, General Electric Company; C. A. Melvin, Griffin Wheel Company; C. S. Klumpp, Hudson & Manhattan Railroad; T. A. Kenney, Allied Engineers, Inc.; C. B. Buchanan; R. P. Stevens; W. J. Stanton; H. B. Flowers; W. A. Lake, Pantasote Company; Ross Hayes, of Adams & Westlake Company; Adrian Hughes, Jr., United Railways & Electric Company, Baltimore; E. P. Waller, General Electric Company; J. A. Queeney, Philadelphia Rapid Transit Company; J. A. Miller, Jr., Electric Railway Journal; W. G. Gove, Brooklyn-Queens Transit Corporation.

Mr. Emmons, guest of honor, was born in Lafayette, Ind. He was graduated from the University of Pittsburgh in 1892 with the degree of civil engineer. For nine years he was connected with the maintenance of way and signal departments of the Pennsylvania Railroad. During the past 30 years he has been actively associated with the development of transportation in several large American cities, serving as president of the Boston & Worcester Street Railway; president of the Boston Elevated Railway and president of the United Railway & Electric Company, Baltimore. He became president of the Hudson & Manhattan Railroad on Oct. 1, 1930, upon the retirement of Oren Root.

A. E. Reynolds Now at St. John

A. E. Reynolds, for eight years vice-president and general manager of the Springfield Gas & Electric Company and the Springfield Traction Company, Springfield, Mo., has been transferred to St. John, New Brunswick, as vice-president and general manager of the New Brunswick Power Company. The St. John Company and the Springfield Companies are subsidiaries of the Federal Light & Traction Company, New York, of which E. N. Sanderson is president.

Mr. Reynolds entered public utility work in Plattsburgh, N. Y., finally being appointed manager of the Plattsburgh Traction Company. After the purchase of this road by the Delaware & Hudson Company, Mr. Reynolds was transferred to Glens Falls, N. Y., as resident manager of the Hudson Valley Railway. He remained in Glens Falls eight years and was then elected general manager of the United Traction Company, serving the capital district, with office in Albany. He resigned this position in 1922 to become associated with the Federal Light & Traction Company and was immediately sent to Springfield, Mo.

Mr. Reynolds has been highly honored in the electric railway and public utility field in Missouri, being past-president of the Mid-West Electric Railway Association and past-president of the Missouri Association of Public Utilities. In Springfield, Mr. Reynolds was connected with many civic clubs and organizations.

Mr. and Mrs. Reynolds left Springfield the middle of October for St. John.

T. E. Thomas Runs London's Municipal Trams

T. E. Thomas, traffic manager in the London County Council Tramways Department, was recently appointed general manager of the undertaking succeeding J. K. Bruce, who retired on June 30. Mr. Thomas, is 48 years of age. He entered the Council's service in 1917, being selected from 38 candidates who applied in response to public advertisements for the position of development superintendent in the traffic branch of the tramways. In 1925 he was appointed traffic manager. Mr. Thomas commenced his tramway career in 1899, when he entered the service of the London United Tramways, Ltd., under the late Sir Clifton Robinson. He was appointed district engineer of the Surrey lines of that company in 1910, and later transferred to the staff of the Underground Group of companies. He became commercial superintendent of that group of companies after the absorption of the London General Omnibus Company. He was awarded the gold medal of the Institute of Transport in 1927, and has been a member of the Council of the Tramways, Light Railways, and

T. E. Thomas

Transport Association since 1927. On taking the post he said it would be his constant endeavor to justify the confidence which had been reposed in him.

A. E. Francis Promoted in San Francisco

A. E. Francis, since 1928 superintendent of ferry terminals for the Market Street Railway, San Francisco, Cal., has been named superintendent of the company's Geneva division, succeeding the late Byron F. Dunn. The division is one of the largest of the system, operating lines in the Mission and Ingleside districts and the San Mateo interurban cars. Mr. Francis began his career as a conductor 27 years ago in the Potrero district. Later he became a motorman and then an inspector, a position he held until his appointment as superintendent of ferry terminals. His successor in that position is G. W. Evington, who has been an inspector since 1915. He formerly was a conductor, also.

✦

Earl F. Theisinger has been made associate editor of *Bus Transportation*, a McGraw-Hill publications. He joined the staff in 1925, writing for departments devoted to maintenance, and shop practices and methods. In 1927 he was made an assistant editor.

Digitized by Google

H. F. Dicke, Lehigh Official, Heads Pennsylvanians

Henry F. Dicke, vice-president in charge of operation of the Lehigh Valley Transit Company, Allentown, Pa., since 1926, has been elected president of the Pennsylvania

H. F. Dicke

Street Railway Association. For eight years before joining the Allentown company in 1925 as assistant to the president, Mr. Dicke was general manager of the Utah Light & Traction Company, Salt Lake City, Utah. At the time he went to Allentown from Salt Lake City, Mr. Dicke also was made vice-president of the East Penn Electric Company, Pottsville, and vice-president of the Williamsport Passenger Railway.

Mr. Dicke is a native of Fort Wayne, Ind. In 1899 he entered the service of the Fort Wayne Traction Company in the accounting department, where he served for a period of five years. He resigned that position to become general auditor of the Ohio & Indiana Construction Company. This company was formed to build a 65-mile line from Fort Wayne to Lima, Ohio. During this construction work Mr. Dicke devoted some time to the engineering department and became superintendent of construction. When the work was completed he was placed in charge of operation of the property owned by the Fort Wayne, Van Wert & Lima Traction Company, which later, with several other properties, merged with the Ohio Electric Railway.

For seven years he had charge of operation of the northern division of the Ohio Electric Railway, consisting of 242 miles of interurban lines, and then resigned to go to Boise, Idaho, as general manager of the Boise Valley Traction Company. He served in this capacity for five years, and was then made general manager of the Utah Light & Traction Company at Salt Lake City, which position he relinquished to take up his duties with the Pennsylvania companies.

L. B. Herrington Heads Union Transfer

L. B. Herrington, president of the Kentucky Traction & Terminal Company, the Kentucky Utilities Company, Louisville, Ky., and subsidiary companies, including the Consolidated Coach Corporation, which was taken over a few months ago, has also been made president of the Union Transfer Company, Nashville, Tenn., controlling interest in the Union Company having been purchased by the Insull interests, for Consolidated Coach Corporation, which operates in Kentucky and Tennessee. Still more recently Consolidated Coach has bought into the Alabama Bus Company and the Capital Coaches, Inc., giving Consolidated 5,000 miles of route and 350 buses.

The Union Transfer Company maintains general offices at Nashville. It operates buses between Nashville and Birmingham, Ala.; Nashville and Hopkinsville, Ky.; Nashville and Knoxville; Nashville and Chattanooga; and Nashville and Florence, Ala., with numerous feeder lines. The Consolidated has gradually linked up practically all of the worthwhile lines in Kentucky, and has been gradually adding to its Tennessee holdings. The Insull interests also hold a considerable amount of stock in the Old Dominion lines and others.

Other than Mr. Herrington, new officers of Union are about the same as for Consolidated. C. R. Quarles, treasurer and general manager of Union, became a member of the board, and assistant secretary-treasurer. J. P. Pope, vice-president of the Kentucky Traction & Terminal Company, and Guy A. Huguelet, Lexington, Ky., are vice-presidents of both companies; A. A. Tuttle, Louisville, secretary-treasurer both companies; L. W. Haley, P. Pherigo and G. C. Jones, all of Lexington, assistant treasurers.

Frank H. Miller on Louisville Executive Committee

Frank H. Miller, vice-president and general manager of the Louisville Railway, Louisville, Ky., on Oct. 15, was elected a director of the company, and a member of the executive committee, succeeding John W. Barr, Jr., who resigned several months ago.

Messrs. Fleming and Weber in New Offices in Chicago

H. B. Fleming

AS NOTED briefly in ELECTRIC RAILWAY JOURNAL for October, the Chicago City Railway, the Calumet & South Chicago Railway, and the Southern Street Railway have elected Harvey B. Fleming president and chairman of the board of directors, succeeding the late Leonard A. Busby. To succeed Mr. Fleming in the position of vice-president of the south side companies, Harry P. Weber, Mr. Busby's law partner, has been chosen vice-president and general counsel.

Mr. Fleming also has been elected a member of the board of operation of the Chicago Surface Lines, a member of the executive committee of that board and of the Chicago City & Connecting Railways collateral trust committee.

Ever since he was placed in charge of tracks, buildings and electrical work for the Chicago City Railway Company in 1899 Mr. Fleming has been associated with city railway operation in Chicago. He was educated in the public schools of Newburgh, N. Y., Newburgh Academy, and Washington University, St. Louis, Mo., from which latter institution he received the degrees of bachelor of science and civil engineer. He is a member of the Sigma Alpha Epsilon fraternity.

Prior to the completion of his education, Mr. Fleming was employed by the T. M. Marvel Company, shipbuilders in Newburgh, and after he was graduated from Washington University, he was appointed assistant engineer of the St. Louis Water Works Department. His first street railway experience was as engineer for the National Street Railway Lines, of St. Louis.

He became chief engineer of the Chicago City Railway in 1905, and since that time has served in various capacities, being elected director and vice-president of the Chicago City Railway in 1912 and appointed chief engineer of the Chicago Surface Lines in 1914 when the surface railways of Chicago were unified and the Surface Lines organization was created. He has been a member of the board of supervising engineers ever since that board was created by ordinance in 1907, representing the so-called South Side lines.

H. P. Weber

Mr. Fleming is also president and chairman of the board of directors of the Hammond, Whiting & East Chicago Railway and the Chicago & Western Railway.

Melvin A. Traylor, president of the First National Bank; James Winston and Harry P. Weber have been elected directors to fill vacancies caused by the deaths of Frank O. Wetmore and Leonard A. Busby and by the resignation of Frank W. Thomas.

Digitized by Google

Redistribution of Duties on Indiana Railroad

HENRY BUCHER, vice-president and general manager of the Indiana Railroad, has announced the appointment of three new trainmasters with responsibilities that supersede the duties of division superintendents, which titles have been abolished. The trainmasters will report to C. C. Lentz, superintendent of transportation.

Arthur Hartgrove, formerly superintendent of the Tipton division of the Union Traction Company, has been made trainmaster in charge of interurban operations on lines between Indianapolis, Muncie and Bluffton, and between Indianapolis, Newcastle and Muncie, succeeding A. R. Manifold, former division superintendent. His headquarters will be at Muncie.

N. K. Smith, formerly division superintendent of the Fort Wayne-Lima Railroad, Fort Wayne, Ind., is appointed trainmaster with supervision over interurban operations between Indianapolis and Peru (Tipton division), Anderson and Marion, and Tipton and Alexandria. Mr. Smith's headquarters will be at Kokomo.

M. F. Strahan will be trainmaster at Indianapolis in charge of interurban operations on all lines between the Indianapolis terminal and immediate suburban territory. He will also have supervision over the Indiana Railroad's interurban buses, connecting Indianapolis, Anderson and Marion.

Mr. Bucher also named two new superintendents of city lines, who will report to J. A. Greenland, general superintendent of transportation—city lines.

C. J. Stanley, with headquarters at Anderson, will have charge of all city street car and bus operations in Anderson and Muncie.

S. R. Humbert, with headquarters at Kokomo, will have charge of city operations in Marion and also of local cars and buses of the Northern Indiana Power Company in Kokomo. The Northern Indiana Power Company's transportation lines are operated under the same co-ordinated management as the Indiana Railroad. E. K. Grimes, formerly superintendent of the Marion city lines, has been transferred to the transportation department at Indianapolis.

Glenn H. Shaw Heads Safety Council's Railway Section

Glenn H. Shaw, personnel and safety director, Akron division, Ohio Edison Company, was elected general chairman of the electric railway section of the National Safety Council, at the recent meeting in Pittsburgh, to succeed Melvin W. Bridges. To his work as a safety director Mr. Shaw brings a background of practical experience as an operator, earnestness of purpose and enthusiasm for his subject. His work with the Ohio Edison Company has contributed in no small measure to the success of that company in combating the accident menace.

In January, 1920, Mr. Shaw went to work for the Cleveland Railway as trainman. A few months later he was singled out for promotion to the position of traffic inspector, and shortly thereafter was made a safety inspector in the company's newly organized accident prevention department. He continued in this capacity until December, 1922, when he went with the Northern Ohio Power & Light Company, Akron division, as personnel and safety director, continuing in this position when the company was recently reorganized as the Ohio Edison Company.

Born on Feb. 8, 1885, at West Almond, Alleghany County, N. Y., Mr. Shaw attended grade schools near the place of his birth, and later completed a course at Wilson Academy, Angelica, N. Y. He entered the service of the Schenectady Railway as conductor in 1906 where he remained until 1910, when he took a position as trainman with the Albany Southern Railroad, a high-speed third rail system between Albany and Hudson, N. Y.

H. F. Merker in Construction Work in St. Louis

H. F. Merker, as president of Merker & Company, St. Louis, Mo., is now engaged in carrying out two large construction contracts in that city. One has to do with the work of preparing the old terminal of the Illinois Traction System at Twelfth and Lucas Avenue for the St. Louis Electric Terminal Railway. The other has to do with the preparation of the site at High, Twelfth, Franklin and Wash Streets for the *Globe-Democrat's* new building. The building contractor in each instance is the Fruin-Colnon Company.

H. F. Merker

Mr. Merker is indirectly associated with the Illinois Power & Light Corporation and the Missouri Rolling Mills Company. It was from the Missouri Rolling Mills Company that he went to Brooklyn in 1923 as engineer of maintenance of way and structures of the Brooklyn surface system. From 1905 to 1919 he was engineer of maintenance of way of the East St. Louis & Suburban Railway. He has been active as an engineer since his graduation from the University of Illinois in 1898.

Activities of W. H. Sawyer Widened

Willits H. Sawyer, formerly president of Stevens & Wood, Inc., has moved his office as executive engineer to 120 Broadway, New York City, where he will also be associated with R. P. Stevens & Company, Inc. In addition to his consulting activities in connection with the management problems of public utilities, Mr. Sawyer will give an appreciable part of his time to the duties required by his recent appointment as co-receiver of the Atlantic Public Service Associates, Inc. He will also continue as receiver for the Springfield Railway, Springfield, Ohio.

Frank Couzens and S. D. Waldon on Detroit Board

Frank Couzens, dismissed by former Mayor Bowles, has been reappointed by Mayor Murphy, of Detroit, Mich., to a place on the Street Railway Commission. He fills the vacancy made by the resignation of Frank Dohaney, appointed by Mr. Bowles. It is understood that Commissioner Couzens will become practically directing head of the system of the Department of Street Railways. He is to have his office in the railway administration building and will devote much of his time to the direction of the department. The post brings no remuneration.

Mr. Couzens is a son of former Mayor James Couzens under whose régime as Mayor of Detroit the municipal system was founded. He was first appointed to the commission in 1929 by John Lodge, then Mayor, but was dismissed by Mayor Bowles last April presumably because he refused to see eye-to-eye with the then Mayor on municipal railway problems.

Charles W. Burton has also resigned from the commission. He has been replaced by Sidney D. Waldon, president of the Rapid Transit Commission. Mr. Burton was appointed to the commission by Mr. Bowles after the recall election of July 22.

Mr. Waldon will continue to act as a member of the Rapid Transit Commission. Mr. Waldon was on the Detroit Street Railway Commission for one year, in 1919, before he became a member of the Rapid Transit Commission.

Mayor Murphy was disposed to merge the two commissions, but Mr. Waldon pointed out that the powers of the two commissions are dissimilar. The Legislature can repeal the rapid transit act, but it cannot amend the charter of Detroit. The work of the two commissions will now be more closely co-ordinated, but the two bodies will retain their separate powers.

English Publisher Visits United States

Among the delegates to the International Roads Congress, held recently in Washington, D. C., is Horace Wyatt, director *Motor Transport* and *Bus and Coach*, published in London. Mr. Wyatt has since made the tour of cities proposed for the delegates, and now intends to visit in New York, Cleveland, Boston, Toledo, Toronto, Montreal and other cities to study the operation of both buses and trucks. He arrived in the United States on Oct. 6 and will leave for home from Quebec on Nov. 14.

✦

B. A. Hinkley, formerly chief inspector, has been promoted to acting superintendent of the Springfield Traction Company, Springfield, Mo., to fill

Digitized by Google

the vacancy caused by the death on Sept. 10 of Charles A. Coons, assistant general manager. Mr. Hinkley started his career with the Springfield system in 1904 as a motorman. He was made chief inspector four years ago.

✦

John E. Davis has resigned as manager of the public relations-public information department of the Kentucky Utilities Company, Louisville, Ky., to take charge of the public utilities promotion work of the Whitney-Graham Company, Buffalo, N. Y. Mr. Davis has had charge of advertising and publicity for the company since Oct. 15, 1924, and has been director of public relations for the last two and one-half years.

✦

John A. Seymour, auditor, has been elected president of the Chicago Rapid Transit Company, Section No. 6, A.E.R.A., for the ensuing year. Mr. Seymour succeeds George E. Tebbetts, engineer of structures, who had served in this capacity since last October.

✦

Charles J. McMorrow, supervisor of service for the Springfield Street Railway, Springfield, Mass., for the last ten years and for 24 years an employee of the company, has resigned to become sales manager for a real estate company in Springfield.

✦

William F. Allen, advertising manager for the St. Louis Public Service Company, St. Louis, Mo., has been appointed to the publicity committee of the ninth annual community fund campaign scheduled for Nov. 10 to 20. He will have charge of public utilities advertising.

✦

Robert H. Mangum, formerly assistant manager of the investment department, has been named manager of the publicity department of the Alabama Power Company. He succeeds W. J. Baldwin, who has been appointed publicity manager for the Commonwealth & Southern Corporation. Mr. Mangum has been connected with the power company since 1927.

✦

R. A. Stephen, formerly assistant treasurer of the Commonwealth & Southern Corporation, has been elected treasurer. B. W. Eggert and F. A. Bain have been elected assistant treasurers.

✦

Harvey C. Couch, president of the Louisiana Power & Light Company, New Orleans, La., and an officer of other companies included in Electric Power & Light Company group, has been elected a director of the St. Louis-San Francisco Railway, filling the vacancy caused by the resignation of Leonard Adkins. Mr. Couch has also been appointed a member of the executive committee, succeeding Eugene V. R. Thayer, resigned.

✦

Fred L. Markham, sales manager American Car Company, St. Louis, resigned his position with the Brill organization on Oct. 1.

✦

Charles S. Kimball, past president of the American Electric Railway Engineering Association and at present connected with the Portland Cement Association, has been appointed chairman of the committee of the Washington Society of Engineers which is to investigate the drainage and surfacing of air ports.

OBITUARY

E. W. Bemis

Edward Webster Bemis, economist and public utilities expert, died on Sept. 25 in Springfield, Mo. Mr. Bemis suffered a general breakdown last winter.

From 1901 to 1909 Mr. Bemis was superintendent of the Water Department at Cleveland, Ohio. He went to New York in January, 1910, as deputy commissioner of water supply, gas and electricity, holding that position until October. Since then he had been a consulting engineer for cities, states and public utility bodies. From 1913 to 1923 he was a member of the advisory board of the valuation bureau, Interstate Commerce Commission. Mr. Bemis wrote extensively on public utility topics.

Mr. Bemis was born in Springfield, Mass., on April 7, 1860, and was graduated from Amherst College in 1880, receiving his A.M. degree there four years later. Johns Hopkins University conferred the Ph.D. degree upon him in 1885. From 1889 to 1892 he was professor of history and political economy at Vanderbilt University. For the next three years he was associate professor of political economy at the University of Chicago. He became assistant statistician of the Illinois Bureau of Labor Statistics in 1896, and from 1897 to 1899 was Professor of Economics and History at the Kansas State Agricultural College.

✦

P. Van Burington

Philander Van Burington, former secretary and treasurer of the Columbus Railway, Power & Light Company, Columbus, Ohio, died on Oct. 8. Mr. Burington retired five years ago after an association of 34 years with the Columbus utility. He was at one time auditor and fiscal agent. Before becoming associated with the Columbus company, Mr. Burington was general freight agent for the old Scioto Valley Railroad, now a part of the Norfolk & Western Railroad. He was 83 years of age.

✦

Charles A. Coons

Charles A. Coons, assistant general manager of Springfield Traction Company, Springfield, Mo., who died on Sept. 10, had long been engaged in electric railway work. For 25 years he was superintendent of the International Railway, Buffalo, N. Y., and for 13 years was general superintendent of the United Traction Company at Albany, N. Y. He was born in Watertown, N. Y., in 1867. He went to Springfield to assume the duties of assistant general manager of the company there in the early part of 1928.

✦

W. W. Arnheim

William Walter Arnheim, president of Marks Arnheim, Inc., men's clothiers, of New York, died suddenly on Oct. 5 of heart disease at his country home at Elberon, N. J.

Mr. Arnheim was not an operating street railway official, but he was a pioneer in the movement for traffic reform. He was one of the first to recognize the extreme seriousness of New York's traffic problem, and with unflagging enthusiasm, combined with the knowledge of an expert, he set out to find a solution. It must have been a source of much satisfaction to him to have witnessed, long before his untimely end, the practical operation of some of the reforms he so long and consistently advocated. Electric Railway Journal differed with Mr. Arnheim on some of the things he suggested, but it respected the man for his zeal.

Mr. Arnheim was born in Cincinnati 49 years ago. He served on the Mayor's committee of plan and survey and as chairman of the traffic committee of the Broadway Association, and had written many articles on New York's traffic problems, for which he from time to time, offered his own solutions.

✦

P. J. Pringle

P. J. Pringle, chief engineer and general manager of the Electric Supply Company of Victoria, Ltd., Australia, died recently at Zurich, Switzerland, while he was proceeding on a holiday visit to England. He formerly occupied various important positions in electrical engineering and consulting work. His last appointment in England was that of borough electrical engineer and tramway manager at Burton-on-Trent.

✦

W. H. Harton

William H. Harton, 57 years of age, general manager of the Cincinnati, Newport & Covington Railway, died on Sept. 16 at Fort Mitchell, near Covington, Ky. Mr. Harton started with the company 38 years ago as an engineer, becoming general manager following the death of James P. Ernst. He was president of the Kentucky Association of Public Utilities, in 1924; and was re-elected to the post at a meeting in Louisville in January, 1929. There was no meeting of the association in 1930. Mr. Harton was well known throughout Kentucky and in Southern Ohio among utility operators.

✦

G. S. Amidon

George S. Amidon, an employee of the United Electric Railways, Providence, R. I., for 44 years, died on Oct. 8. During his service he had been superintendent of the Riverside, Olneyville and East Providence divisions. At the time of his death he was employed at the North Main street carhouse. He entered the employ of the railway at the age of 21, as a conductor, and was successively starter, inspector and superintendent. Mr. Amidon was born in Springfield, Mass., 66 years ago.

✦

William B. Cutter, one of the organizers of the Buffalo-Depew Railway, now part of the interurban lines of the International Railway, Buffalo, N. Y., is dead. He was born in Buffalo on Dec. 14, 1853, and was a pioneer in the development of real estate in the suburban districts adjacent to Buffalo. The railway was organized in 1898. About ten years ago Mr. Cutter retired from active business.

Digitized by Google

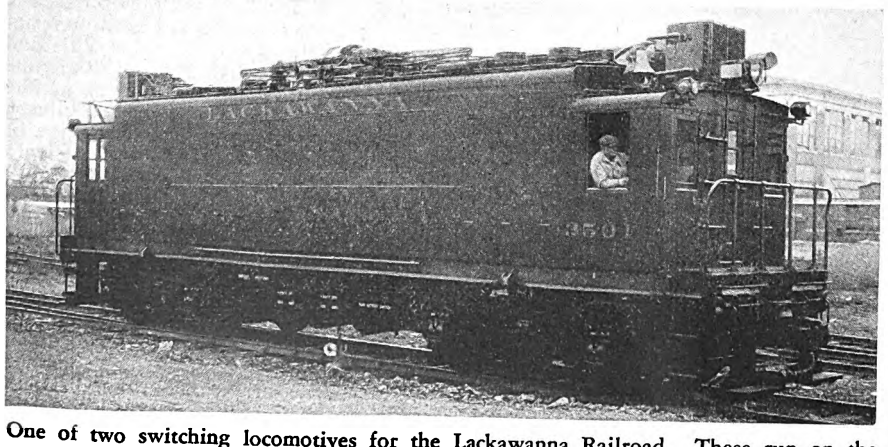
Lackawanna Railroad Gets Switching Locomotive

In connection with the suburban electrification out of Hoboken, the Delaware, Lackawanna & Western Railroad some time ago ordered two electric locomotives. These are for transfer service between the Jersey City yards and the Secaucus and Harrison yards and also for switching in these yards. The first of the locomotives was recently shipped from the Erie Works of the General Electric Company. These locomotives are of the "three-power" type, capable of operating from the 3,000-volt trolley, from an oil engine or from a storage battery.

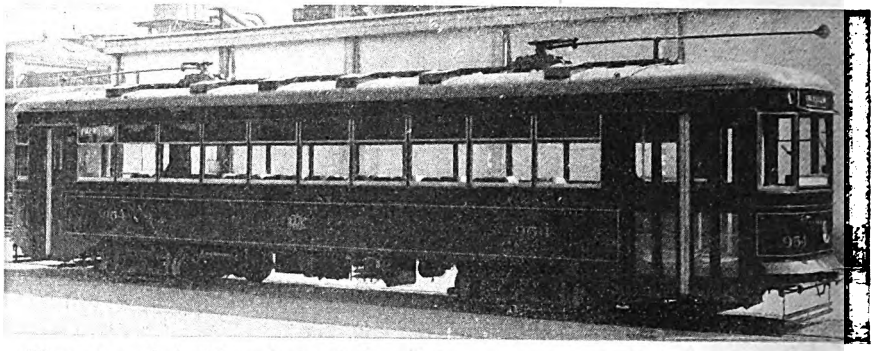
The locomotive is of the double-truck box-cab type with four direct geared, direct current box frame series motors, designed to run two in series on 3,000 volts. A 300-hp. Ingersoll-Rand oil engine, direct connected to a 750-volt d.c. generator furnishes an auxiliary source of power. There is also a storage battery of 360 Type MVA-21 Exide ironclad cells.

In the electric zone the motors operate continuously from the 3,000-volt d.c. trolley. Outside the electric zone the engine-generator set charges the storage battery and supplies power to the traction motors. Current is furnished to the motors at 600 to 700 volts. At light loads the excess power of the engine charges the battery; at loads above 300 hp. the battery discharges and relieves the engine from overload. Auxiliaries operate from the storage battery. Increased tractive effort at the higher speeds is obtained on internal power by shunting approximately 50 per cent of the field current through a non-inductive resistance. The single unit Type PCL control is non-automatic. By means of contactors and transfer relays, the trolley and battery circuits are interlocked so that traction motors can be energized from only one of these sources at a time.

The total weight of the locomotive, with fuel, water and sand, is 124 tons, and the maximum tractive effort at starting is 60,000 lb. The maximum permissible speed is 40 m.p.h. Length inside knuckles is 47 ft. 10 in. Locomotive, in running order, weighs 248,000 lb.; all weight is on driving axles.



One of two switching locomotives for the Lackawanna Railroad. These run on the 3,000-volt overhead, storage battery or on oil-electric power



New type of double-end car delivered for service on the Lehigh Valley Transit

New Cars Placed in Service by Lehigh Valley Transit

Ten new cars have been recently delivered by J. G. Brill to the Lehigh Valley Transit Company, of Allentown, Pa., for service on the Allentown-Bethlehem loop. Many changes with respect to the old type of equipment have been incorporated in these cars. They are lighter, weighing 37,320 as compared with 42,000 lb., and attain a higher speed. Acceleration can be controlled by either hand or foot operation New types of springs and shock absorbers have made possible low body lines. Total seating capacity of each car is 48 passengers. Detailed specifications as follows:

Name of railway	Lehigh Valley Transit Company, Allentown, Pa.
Number of units	10
Type of unit	Two-man, motor, passenger, city, double end, double truck
Number of seats	48
Builder of car body	J. G. Brill Co., Philadelphia, Pa.
Date of order	March 26, 1930
Date of delivery	Oct. 2, 1930
Weights:	
Car body	17,920 lb.
Trucks	9,900 lb.
Equipment	9,500 lb.
Total	37,320 lb.
Bolster centers	22 ft. 5 in.
Length over all	45 ft. 10 in.
Length over body posts	32 ft. 5 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 4 in.
Height, rail to trolley base	10 ft. 10 in.
Window post spacing	36¾ in.
Body	All steel
Roof	Arch
Doors	End

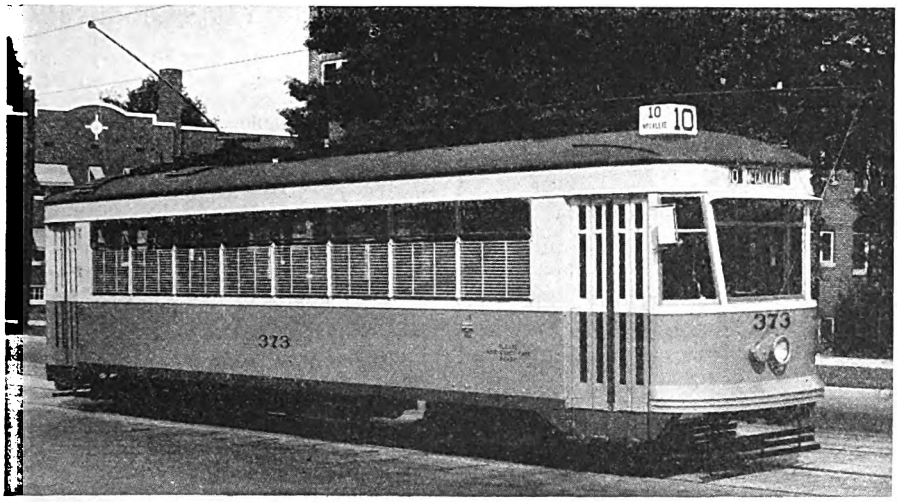
Interior of car has an enamel finish and linoleum flooring

Air brakes	Westinghouse SME
Alarm gong	E.S.S. Co's pneumatic
Armature bearings	Plain
Axles	Hammered steel
Car signal system	Faraday buzzers
Compressors	General Electric Co.-CP-27
Conduit	Flexible
Control	Westinghouse VA
Couplers	Portable bar
Destination signs	Keystone
Door mechanism	National pneumatic
Doors	Folding
Finish	Beckwith Chandler enamel
Floor covering	Armstrong linoleum
Gears and pinions	Nuttall
Glass	Plate in vestibule
Hand brakes	Peacock staffless
Heaters	Consolidated
Headlights	Electric Service Golden Glow
Headlining	Agasote
Interior trim	Statuary bronze
Journal bearings	Plain
Journal boxes	Brill semi-steel
Lamp fixtures	E. S. S. No. 27902
Motors	Westinghouse 510-E No. 4, inside hung
Painting scheme	Red
Registers	International R-12 double
Roof type	Arch
Roof material	Wood
Sanders	Ohio Brass
Sash fixtures	O. M. Edwards
Seats	Brill 201-B
Seat spacing	31 in.
Seating material	Deep buff taxi grain leather
Slack adjusters	Brill mechanical
Steps	Stationary
Step treads	Kass
Trolley retrievers	Earll
Trolley base	U. S. 24-A
Trolley wheels	More-Jones
Trucks	Brill 177-E1
Ventilators	Brill
Wheels, type	Rolled steel 26 in. diameter
Wheelguards	HB type lifeguards
Window cleaner	Brill

Okonite Company, manufacturer of insulated wires and cables, announces the appointment of Theodore T. Kennedy as district manager of its Los Angeles office.

Digitized by Google

Knoxville, Tenn., Gets New Cars



One of the ten new cars recently delivered to Knoxville Power & Light Company, Knoxville, Tenn., by Perley A. Thomas Car Works. The cars are equipped with pneumatically operated doors, green plush seats and aisle flooring of hard maple wood strips. The car weighs complete 32,500 lb.

Armco Creates Railroad Division for Sales Promotion

American Rolling Mill Company has organized a new division of its sales forces, which will be known as the railroad division. This division will combine the handling of wrought steel wheels, iron and steel sheets and various other products. The headquarters will be at the general offices in Middletown, Ohio. Logan T. Johnston has been made manager, and H. M. Arrick, assistant manager.

Mr. Johnston was formerly with the Standard Steel Car Company, of Pittsburgh, and later assistant to the vice-president in charge of the commercial activities of the forged-steel wheel division. Mr. Arrick, before joining the Armco sales department three years ago, was associated with the operating department of the Pennsylvania Railroad.

Three district offices have already been established. W. B. Quail will manage the New York office, assisted by W. A. Dibblee and E. C. Bray. The latter will be located in the Philadelphia office. Ernest Baxter has been made manager of the Chicago district. He will continue, also, in his present capacity as vice-president of the Sheffield Steel Corporation, in charge of railroad sales. F. E. Finley has been made manager of the St. Louis district.

Bus Deliveries to Electric Railways

Deliveries of buses to electric railways have continued steadily during recent weeks, although at somewhat lower level than during previous months. Twin Coach Corporation reports that the greatest volume of sales for one month in the history of the company was recorded during September. Deliveries for that month are valued at more than $500,000, a gain of more than $100,000, or 30 per cent, over the value of deliveries during September, 1929. Among the deliveries reported by Twin Coach are included twelve urban, small-capacity buses to the Pacific Electric Railway, Los Angeles, and five urban, large-capacity buses to the Boston Elevated Railway.

For the month of September, General Motors Truck Company reports the delivery of five Type W-21 Yellow Coaches to the Virginia Electric & Power Company, Richmond, Va.; five Type U-21 Yellow Coaches to the Memphis Street Railway, Memphis, Tenn.; and four Type W-21 Yellow Coaches to the Mississippi Valley Public Service Company, Milwaukee, Wis.

Deliveries by Mack-International Motor Truck Corporation are reported as three Model AB, 29-passenger buses to Jamaica Central Railways, Jamaica, N. Y., and one Model AB, 230-in. bus chassis to Utah Light & Traction Company, Salt Lake City, Utah. From A.C.F. Motors Company, Illinois Power & Light Corporation, Chicago, accepted delivery of two 25-passenger, parlor car buses, and Capital Traction Company, Washington, D. C., accepted delivery of one 33-passenger, parlor car coach. White Company delivered two Model 65A buses to Louisville Railway.

Financial Statement of G. E. for Nine-Month Period

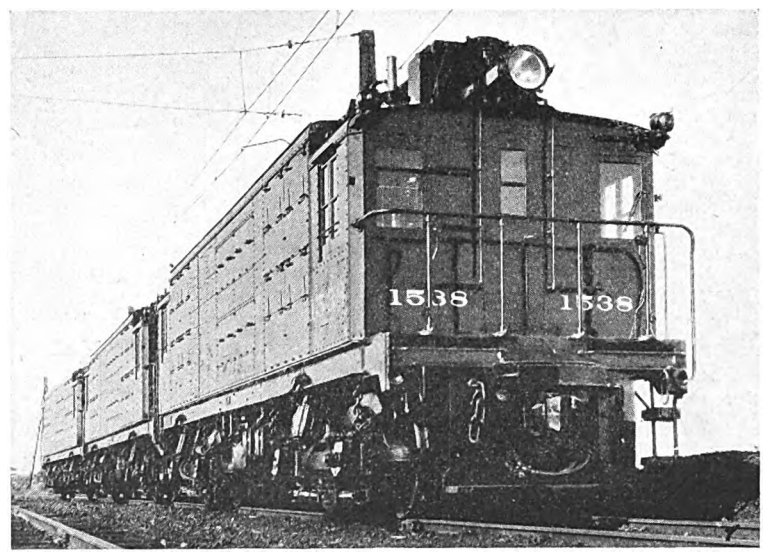
For the nine months ended Sept. 30, General Electric Company indicates a profit available for common stock dividends of $42,518,709, equal to $1.47 per share, compared with $47,965,832, or $1.66 per share on the number of shares now outstanding last year. Comparison of the principal items in the income account for the two periods follows: Net sales billed, $287,886,541, against $301,812,809; cost of sales billed, including operating, maintenance and depreciation charges, reserves and provisions for all taxes, $254,760,877, against $263,316,462; net income from sales, $33,125,664, against $38,496,346; other income, less interest paid and sundry charges, $11,324,254, against $11,400,578; net profit available for dividends, $44,449,918, against $49,896,925; cash dividends on special stock, $1,931,210, against $1,931,093.

Carey Elastite Patent Sustained

In a decision recently handed down by Judge Cooper in the United States District Court in the Northern District of New York, patent No. 1,171,441, under which the Philip Carey Company Elastite rail filler is manufactured, was held to be valid. The Philip Carey Manufacturing Company brought suit against Henry Dumary, an Albany contractor, and the Albany Milling Corporation, a dealer. The infringing rail filler was manufactured and the suit was defended by Serviced Products Corporation, of which Albert C. Fischer, a former employee of the Philip Carey Company, is president.

Judge Cooper's decision stated that the rail filler as manufactured under the patent in question "is a real success and a real benefit to the cities and street railway companies having the problem ever before them of repairing, paving and repaving streets containing railway tracks."

New York Central Gets 42 Electric Locomotives



Three of 42 three-power electric locomotives, ready to leave the Erie, Pa., works of the General Electric Company. The units shown above will be used for the West Side electrification of the New York Central Railroad in New York City. Power may be obtained from a third rail, from a Diesel engine and battery combined, or from the battery alone.

Digitized by Google

General Car & Coach Corporation Starts Production

Manufacture of standardized street cars and trolley buses for the General Car & Coach Corporation of Albany, N. Y., according to an announcement recently made by President O. F. Warhus, is to be done under contract by the St. Louis Car Company. The cars will be manufactured following the designs developed during the last four years and patented by Mr. Warhus.

Production will be started immediately by an organization already fully equipped with the necessary tools and machinery and with an established reputation for its own products. An advantage of this arrangement will be that no additional capital outlay will be made for equipping a new factory. This is expected to enable the General Car & Coach Corporation to place its product on the market at a particularly favorable price. Sales offices and headquarters have been established at 100 State Street, Albany, N. Y.

Advertising Literature

General Electric Company has published a 75-page booklet, "Heat-Treatment of Steel." This booklet covers briefly the heat-treatment of steel, including hardening, annealing, normalizing, casehardening and tempering. The second part is devoted to the discussion of the effects of electric heat treatment on production costs. Construction and maintenance of G. E. electric furnaces is covered in a third part.

✦

Camden Forge Company, Camden, N. J., has printed for distribution a pamphlet devoted to the discussion of equalizers, drawbars and other forgings of hammered wrought iron, carbon steels or alloy steels.

Railway Utility Company, Chicago, Ill., offers a pamphlet describing heating and ventilating equipment for electric cars, trolley buses and buses.

✦

General Electric Company has issued publication GEA-1228 describing the electrification of the Cleveland Union Terminal.

Westinghouse Sales

Net income during the first three quarters amounted to $11,355,619 after depreciation, reserves and taxes. After interest charges, the balance available for common and preferred stockholders amounted to $11,352,244, or $4.25 a share on outstanding stock of both classes as compared to $7.33 a share last year and $6.03 the year before. Balance available for dividends showed a decline over the nine months of approximately 42 per cent.

A.E.R.A.'s Golden Anniversary Convention

THE 50th, or Golden Anniversary, convention of the American Electric Railway Association will take place in the new auditorium and convention hall at Atlantic City, Sept. 26 to Oct. 2, inclusive, 1931.

In connection with the convention, the operating and manufacturer members of the association will hold the usual exhibition of appliances and other manufactured articles of interest to the managers and other important executives and operating officials of the urban and interurban transportation companies of the country.

A diagram showing exhibition spaces together with application for space will be available to the membership about May 1, 1931.

Lincoln Arc Welding Prize Competition Is Announced

Designers and engineers in every industry, where iron and steel form all or a part of the manufactured product, are again given the opportunity by the Lincoln Electric Company, Cleveland, Ohio, to show their skill and ingenuity in utilizing the advantages of arc-welded construction. There will be awards to the amount of $17,500 for the 41 best papers submitted in the competition. The papers entered in the competition will be judged by the jury of awards composed of the electrical engineering department of Ohio State University under chairmanship of Prof. Erwin E. Dreese. The purpose of this second Lincoln arc welding prize competition, as announced by its sponsors, is to stimulate designers and engineers in every line of industry to think of the manufacture of their own products by the use of arc welding and to increase their knowledge of the feasibility of its application.

Award for the first prize paper will be $7,500; for the second prize paper, $3,500; for third prize paper, $1,500; for fourth prize paper, $750; for fifth prize paper, $500; for sixth prize paper, $250, and for the seventh to the 41st prize papers, $100 each.

The competition will be open to any person in the world except the employees of the sponsors. The closing date for the competition will be Oct. 1, 1931. Other details of the rules of the competition are expected to be announced shortly.

Electric Railway Material Prices—November 1, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	9.50
Lead, cents per lb	5.10
Nickel, ingot, cents per lb	35.00
Zinc, cents per lb	4.00
Tin, Straits, cents per lb	25.50
Aluminum, 98 to 99 per cent, cents per lb	23.30
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	33.00
General service	30.00

Bituminous Coal

Pittsburgh mine run, net ton	$1.25
Central, Ill., screenings, f.o.b. mines	0.75
Kansas screenings, Kansas City	1.40
Big Seam, Ala., mine run	1.50

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Track spikes, 9/16-in. and larger, cents per 100 lb	2.80
Tie plates, cents per 100 lb	2.075
Angle bars, cents per 100 lb	2.75
Track bolts and nuts, cents per 100 lb	3.90
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	1.35

Hardware—Pittsburgh

Wire nails, base, per keg	$2.05
Sheet iron (24 gage), cents per lb	2.45
Sheet iron, galvanized (24 gage), cents per lb.	3.05
Auto body sheets (20 gage), cents per lb	3.50

Waste—New York

Waste, wool, cents per lb	12.00 to 15.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	9.00 to 13.00
Colored	5.00 to 7.00

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb	10.2
White lead in oil (100 lb. keg), cents per lb	13.75
Turpentine (bbl. lots), per gal	0.44
Putty, 100 lb. tins, cents per lb	5.50

Wire—New York

Bare copper wire, cents per lb	11.75
Rubber-covered wire, No. 14, per 1,000 ft.	4.55
Weatherproof wire base, cents per lb	12.75

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.50
Paving brick 3½x8½x4, N. Y., per 1,000 in. carload lots, f.o.b.	50.00
Paving brick, 3x8½x4, N. Y., per 1,000 in. carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15
Asphalt (Texas), in package, N. Y., per ton	22.50

Scrap Metal—New York

Heavy copper, cents per lb	7.50
Light copper, cents per lb	7.00
Heavy yellow brass, cents per lb	4.50
Zinc, old scrap, cents per lb	2.00
Lead, heavy, cents per lb	3.75

Old Material—Chicago

Steel car axles, net ton	$15.25
Cast iron car wheels, gross ton	13.75
Steel car wheels, gross ton	15.25
Leaf springs, cut apart, gross ton	15.75
Angle bars, gross ton	13.25
Brake shoes, net ton	8.75
Rails (short), gross ton	14.25
Rails (relaying), gross ton (65 lb. and heavier)	28.50
Machine shop turnings, gross ton	5.50

TRADE NOTES

Cutler-Hammer, Inc., reports for the quarter ended Sept. 30, 1930, shipments amounting to $2,198,116, compared with $2,683,398 in the preceding quarter, and $3,321,450 in the third quarter of the previous year.

✦

Westinghouse Electric & Manufacturing Company offers a new eight-page circular describing a metal-inclosed truck-type switchgear, manually and electrically operated, built for three-phase, 60-cycle supply, 3,000 amp. maximum and 15,000 volts maximum. The circular is identified as Circular 1892.

✦

C. J. Bowers has been appointed production manager of the Lincoln Electric Company's plant in Cleveland.

✦

Ohio Brass Company has declared an extra dividend of $1 per share on the common stock, in addition to the regular quarterly dividend of $1.25 per share, both payable Oct. 15 to holders of record Sept. 30.

✦

Harold F. Kneen has been appointed plant superintendent of the Lincoln Electric Company, Cleveland, Ohio, manufacturer of "Linc-Weld" motors and "Stable-Arc" welders. Mr. Kneen, who is a graduate of Cornell University, with the degree of mechanical engineer, came to the Lincoln Electric Company as assistant plant superintendent in June, 1929.

✦

Paramount Cab Manufacturing Corporation and subsidiaries announce, for the year ended Sept. 30, a net loss of $280,912 after depreciation, interest and other charges. This loss compares with a net profit of $1,115,981, or $4.46 per share last year.

Digitized by Google

Electric Railway Journal

Consolidation of
Street Railway Journal and Electric Railway Review
A McGraw-Hill Publication—Established 1884

JOHN A. MILLER, JR., *Editor*

Volume 74 New York, December, 1930 *Number 13*

Santa Claus: His Name Is Service

IN THE welter of comment on the recent election about the attitude of the Pinchots, the Roosevelts, the Crosses and other gubernatorial and minor candidates toward the utilities, sight has almost been lost nationally of the significance to the electric railways of the results of the referendums in the state of California, in San Francisco, in Boston and in Omaha. In several of these places the issue was hotly contested, but in every instance the outcome was favorable to the transportation companies.

In California the plan to revise the state tax on electric railways was approved. This measure is significant in that the electric railways will be taxed in the future at a rate more in proportion to that of other utilities and to private property. In San Francisco both the issue to limit the fare on the municipal railway and the one to extend the franchise of the Market Street Railway for twenty-five years were hotly contested. The Municipal Railway proposal was defeated. The franchise extension won. Even the stoutest local advocate of municipal ownership was forced to admit that municipal ownership of the railway had reached the deficit stage and that in all likelihood the deficit would become progressively larger.

The worst that the loudest opponent of the Market Street Railway could say against that company was that "the Market Street Railway has now for years been working itself into the good graces of the people—giving good service and especially giving courteous service, looking out for every little angle that means pleasing the public." This, indeed, was a trying situation. As the *Wall Street Journal* so aptly said, it showed how the "interests" are ever devising new schemes to exploit the public.

In Boston the voters had the choice of returning the system to private ownership and management, continuing public control, or going to municipal ownership. A substantial majority was returned for the present plan of public control. There, too, the issue was vigorously contested. Each proposal had its renowned adherents. The advocacy was forensic but seldom vituperative. Now the Legislature, by mandate of the people, has been definitely appraised of the feeling of the public in the district served by the Elevated. The result is to lift the perennial debate over the Elevated out of the arena of politics and place the mass-transportation system of Boston in a position to build safely, strongly, and well.

In Omaha the plan to construct a competing bridge over the Missouri River to parallel the structure of the Omaha & Council Bluffs Street Railway was defeated. Here again virtue is its own reward, for the vote is one indicating confidence in the present management policies for the railway as laid down by President Shannahan and his associates.

By amendment to the constitution of the state of Utah, a tax commission was created in whose hands will be placed the task of assessment of all public utilities. Formerly utilities serving communities within a single county were assessed by the county assessor. This charge should result in more equitable utility taxation throughout the state.

Judged by these referendums and the outcome of the vote in Chicago earlier in the year, if there is any Santa Claus for the electric railways where public issues are involved, his name is Service.

Naming the New Baby

CARE always should be exercised in christening a new baby, as the name given in infancy cannot well be changed in later life. That is true also of a new type of transportation vehicle, and it would be well at this time to devote some thought to the latest development—the rubber-tired vehicle propelled by electric motors deriving their energy from an overhead contact line.

More than a decade ago, a vehicle having a certain similarity to the present vehicle, yet in reality quite different, became known as the trackless trolley. Opinion is practically unanimous that this unattractive name should be relegated to the scrap heap, where many of the original vehicles have already gone.

Several names have been suggested for the modern type of equipment. Among them are electric coach, electric bus, trolley coach and trolley bus. Good reasons exist for not using either of the first two. Confusion would inevitably arise from the similarity of the terms gas-electric bus and electric bus. Moreover, the vehicle actually is not an electric bus or coach. Those names properly belong to vehicles deriving their power from storage batteries. While few storage-battery buses are in service any longer, there are a sufficient number of storage-battery trucks to perpetuate the association between the name electric vehicle and storage-battery operation. Most important of all, however, is the reason that the public would be unlikely to adopt any such name. Were it adopted by the local transportation industry, it seems probable that the public would ignore it and use the old and undesirable appellation, trackless trolley.

Between the names trolley coach and trolley bus, there is not much to choose. Both describe the vehicle with reasonable accuracy. Endless arguments have been waged concerning the exact meaning of coach and bus. A hundred years ago, it may have been true that a coach was an imposing and elegant vehicle to carry the gentry on their travels, while a bus was a cheap, crude omnibus for the accommodation of the common herd. Nowadays, however, no such distinction exists. The steam railroads

Digitized by Google

use the word coach to distinguish an inferior class of accommodation as compared with the Pullman car. On the other hand, a number of electric railways use the term motor coach to distinguish a type of service superior to that given by the ordinary bus.

In England, where this type of vehicle has been widely used for some years past, the term trolley bus is universally used. Practically all the electric railways in the United States operating this kind of service call it a trolley bus. The manufacturers of the vehicles and the equipment required for their operation are virtually unanimous in favoring the name trolley bus. All things considered, it appears that the term trolley bus best fits the vehicle and is most likely to be adopted by the public if used by the industry.

Manufacturers Show Confidence in the Industry

REAFFIRMING their faith in the elemental soundness of the electric railway industry, the manufacturers' representatives attending the recent meeting of the A.E.R.A. Convention Exhibit Committee promised to take as much or more space in 1931 as was used by their companies in 1929. Coming after a period of prolonged depression, and at a time when the industrial horizon is still clouded with elements of doubt and uncertainty, the decision was a courageous one. There was no hesitation, no equivocation. A full year in advance of the event the members of the committee, representing a score or more of the leading manufacturers put themselves on record by underwriting the success of the exhibit of the 50th annual convention.

This action of the committee is more than a mere gesture of confidence. It is a definite expression of faith on the part of hard-headed, calculating business men. It indicates a belief in the early restoration of the buying power of this industry. As any increase in buying power of the railways is predicated upon an increase in revenue which can come only with business recovery, it may be assumed that the manufacturers, taking a broad view of the situation, look for an early end of the present depression.

The electric railways were among the last to feel the effect of the decline. It does not follow, however, that they will be among the last to recover. It is not too much to hope, in fact, that they may be among the first to get back to normal. The courageous action of the exhibit committee in planning for a record exhibit of electric railway materials is a step in this direction.

Making Faster Street Car Operation Practicable

WITH general street traffic in the larger cities becoming more and more congested the need for public transportation vehicles that can fight their way successfully through the maze and maintain speeds as high as or higher than the average on the street becomes daily more apparent. The street car, while its maximum speed is more than ample for city conditions, is handicapped by the characteristics of the motor that prevent acceleration at a high rate up to anywhere near the top speed.

More power on the street car undoubtedly would be of material advantage, not only in permitting a higher initial acceleration, but in maintaining that rate long enough to bring the car up to the maximum permissible speed, thus not only allowing the car to keep up with the procession of automobiles but allowing it to take advantage of any opportunities to get ahead. Electric railway men usually have put aside the idea on the basis of cost. Not only are larger and heavier motors required, but the power demands and the energy cost will certainly be greater. However, as J. W. Welsh shows in this issue, the extra cost may well be made up by a reduction in the labor charge by virtue of the faster schedule. With the present trend toward lower car weights, there may be the possibility of getting the higher accelerations demanded with no great increase in the power drawn from the line.

Series motors have been used for street railway power so long that few engineers consider any other type suitable. From time to time inventors have urged modifications of the series motor for the purpose of obtaining regenerative control, with a return of energy to the trolley. These plans have been so complicated that none of them ever has come into general use. However, the plan being tried in Paris, France, and discussed in this issue indicates that a way has been found to use compound motors which not only is less complicated than the older plans for regeneration, but which will give a more satisfactory control of speed and power than series motors will permit. Furthermore, it has the advantage of regeneration without any special attention on the part of the motorman.

These new developments indicate that the entire subject of railway motors may well be opened up once more. Certainly the need exists for equipment that will not block the streets. The possibilities of such plans as these, or of other plans that may be devised under the spur of competition, merit the most earnest consideration.

Seattle's Municipal Railway in Insolvent Condition

SEATTLE'S attempt to run its railway has failed and failed miserably. It did not need the recent report of the citizens' committee to make that plain. That was patent long ago. But it did take the report of the citizens' committee to establish the extent of the failure. Seattle's municipal railway is in an insolvent condition. There has been too much public pressure. But the situation is not without hope. According to the committee, the system should be placed in the hands of an operating body as free as possible from public pressure.

The committee suggests almost an entirely new deal for the system—a deal that takes cognizance of relief for the railway from paving burdens and other onerous charges. This is significant to private companies seeking relief from similar imposts on the score of their unfairness. The most significant thing, however, is that the city has failed in its attempt to amortize the purchase price out of earnings. That it would so fail was a foregone conclusion, but now the fact has been established beyond the possibility of a quibble.

But after all the crowning presentment of the committee was the statement that the whole trend of government for the last half century has been to make all government more responsive to the public. This may be all right in government, but not necessarily in business.

Digitized by Google

And then the committee says, "Operation of the street car line is business." It would, indeed, be difficult to make eight words say more.

In this connection, it is well to note some interesting parallels between the Seattle and Portland situation as illustrated by this report, on the one hand, and the Carey & Harlan plan for Portland, on the other hand. In the first place, the Seattle report bears a very close relation to the Carey & Harlan plan in its treatment of the paving problem. The language and arguments in favor of transferring the burden of paving between the tracks to some support other than the department in the one instance, and the company in the other, are nearly identical.

For Portland, Carey & Harlan advocated that the city acquire the tracks and pavement between the tracks, and assume responsibility for construction and maintenance. In Seattle, the department has been attempting to take care of such items of expense out of railway revenues, but now proposes to transfer this burden to the general taxpayers or assessment districts. Seattle, however, would go farther and tax automobiles, diverting some of such tax money to the purpose of building and maintaining streets.

The utter failure of the Seattle Railway Department to amortize its investments out of earnings, and at the same time maintain its physical property is no surprise to those familiar with transportation problems. Whether the plan for Portland, calling for the amortization of the company's investment in tracks and streets, out of earnings, can be successfully accomplished is problematical. In some respects, Portland is at the crossroads. It should proceed cautiously.

Undermining an Essential Service

DISREGARDING the costly lessons of past experience, municipal authorities in numerous American cities are permitting a new kind of transportation rate war to develop. Cut-rate taxicab service by irresponsible individuals has been allowed to grow to a point where it threatens to undermine organized transportation service. While most of these cheap taxi operations are on an extremely unstable financial basis, it appears that the operators may be able to make both ends meet so long as they are not compelled to assume any definite service obligations. In many localities they have cut deeply into the revenues of mass transportation agencies.

On the surface, the harmful effects of cut-rate taxicab operation are not clearly visible. To the man in the street it appears that the taxicab operators are able to make a living and the users of their service benefit by its cheapness. Hence, he is content to let the situation stand as it is.

That view, however, takes no account of other factors of vital importance. The effect of cut-rate operation extends far beyond the taxicab operator himself and his patrons. It is depriving other transportation agencies of revenue essential to their successful operation. It is undermining a service which it cannot replace. Under no imaginable circumstances could the taxicab become a satisfactory substitute for the street car or bus. For several people going to the same destination, it might be possible to travel cheaper by cut-rate taxicab than to travel by street car or bus, but for individuals traveling alone the cost would be excessive. Moreover, the streets of our cities are already too congested to accommodate the vast number of vehicles that would be required to perform mass transportation service by taxicab.

In view of these facts, it is clearly in the public interest to protect the mass transportation agencies from this destructive competition. This can be done only by adequate regulation of taxicab operations. The number of cabs should be limited to the legitimate demands of public convenience and necessity. Experience in the six states where this has been done on a state-wide basis, and in about a dozen cities in other states where it has been done by local ordinance, shows the value of such limitation. If reasonable service standards are required, taxicab fares will automatically be placed on a fair competitive basis. To the business they can secure on that basis the taxis are honestly entitled. But to permit irresponsible taxicab operators to continue to take business from established agencies required by law to maintain high service standards can result only in disaster to the users of public transportation.

Progressive Management Requires Research Support

DEFINITE need exists for fact-finding research in the electric railway field. That it has been employed to a considerable degree by many companies is evidenced by the constant development and improvement in practically all phases of railway operation during an era in which gross revenues have been steadily declining. The introduction of such competitive factors as the automobile, the bus and the low-rate taxicab forced the railways to search their own operations for economies, for the elimination of waste and, in general, for practices that would result in a lower operating ratio. In this they have been remarkably successful as shown by the steady increase in net revenue of the industry and improvement of physical plant, which occurred up to the beginning of the present business depression.

Necessity, however, has not been wholly responsible for research or experimentation in the past. A certain "research-mindedness" is natural to an industry using a large amount of complicated electrical and mechanical equipment. Much has been done along these lines but the railways have not until recently applied research to the problems of management. In that field the value of research is even greater. From the broadest operating policy to the smallest detail, management is responsible. Unless it can see clearly and without prejudice the facts supporting its practices, the facts that remain sound, those that have become obsolete, and the new facts which may have entered into the situation, successful results are impossible.

Many railways are making energetic efforts to operate on a factual basis and are employing research to keep pace with changing conditions. Not many, however, have placed research in a position to be really effective. The research engineer must be free from the stress of operating responsibility; he must be in a position to co-ordinate effectively the problems of management and the efforts of his department workers in solving them, and he must have the authority to follow up the results of research and demand the utilization of its findings. If management is not willing to give research this major position in its organization, operation becomes a habit and practices change only under the forces of emergency or on the unsupported conclusions of personal opinion.

Digitized by Google

RESEARCH DEPARTMENT

Aids Railway Operations

Pittsburgh Railways Endeavors To Conduct Its Operations on a Basis of Facts Disclosed by Systematic Investigation. Detached Research Group Is One of Major Departments. It Is Composed Principally of Individuals Transferred from Other Departments

MANAGEMENT research, or an orderly application of simple but sound methods in the effort to solve everyday problems, is a major factor in the operations of the Pittsburgh Railways. This company has long been among the leaders in experimental research—principally in car design. Such habit of thought naturally led to a recognition of the fact that approaches to all problems are fundamentally similar, though they may vary infinitely in detail, and that the same procedure which had proved so successful in dealing with technical problems could be applied to the difficulties confronting management. In recent years street railway managements have found themselves faced with constantly changing conditions and in need of every instrument that could be found or devised to help identify previously determined facts which remained pertinent, point out those which had become obsolete, and discover the entrance of new facts. Consequently, a research department was established for the purpose of bringing to the aid of management those practices and methods that had been accepted as matters of course in technical and experimental research for many years.

Fundamentally, the research department is separate and detached from all other departments in the organization. It is non-competitive in the strictest sense and is furnished as an instrument by the management for the use of officials and employees. The measure of the utility and value of the department is in the consumption or use of its findings or research releases.

As the department exists now, it is composed chiefly of individuals transferred from other departments. When first organized, it consisted of a research manager, a research engineer, a combined stenographer and routine office worker, and a small statistical group which had been doing statistical work for the operating management.

For about two and one-half years the department continued to function approximately as organized. Then it was re-organized, consolidated with the general operating offices and placed under the supervision of the assistant to the vice-president, whose title was changed to "research manager."

The work is divided into three sections: that done by an analyst or economist; an engineering division, in charge of a research engineer; the general operating office in charge of an office manager.

The work referred to the analyst consists of studies and researches where the broader principles of economics are involved. The economic factors involved in fare structure, pensions, insurance, etc., are typical.

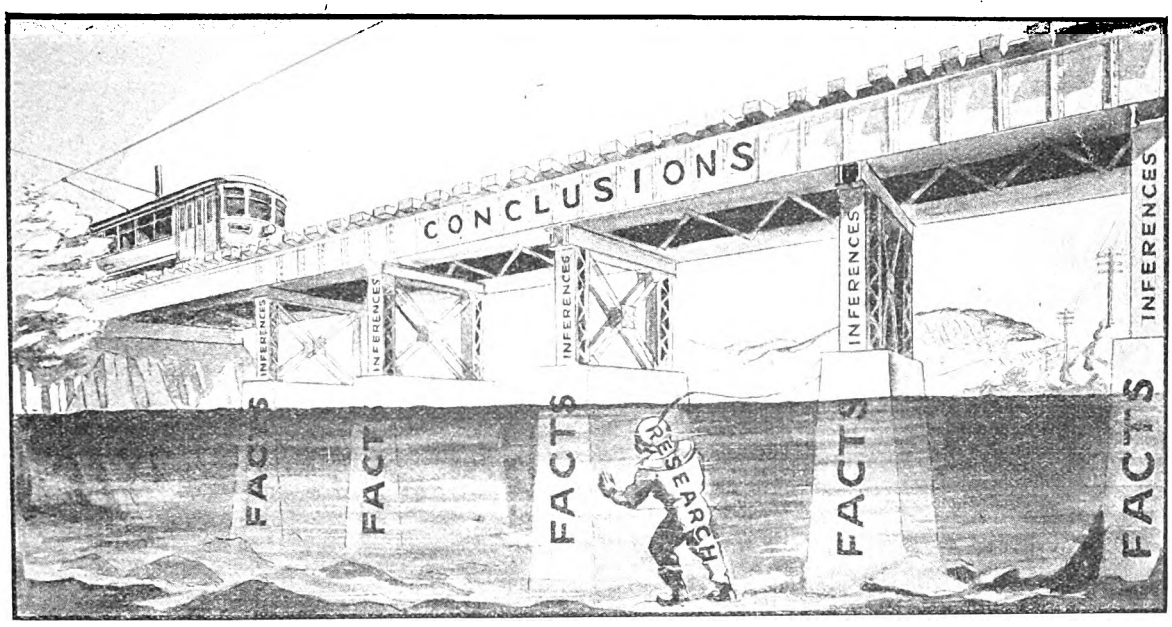
The engineering division, as indicated by its name, is engaged in practically applied research engineering. It is in charge of a civil engineer, with the title of "research engineer," who was transferred from the roadway department. This division has been manned completely by bringing in employees from other departments rather than importing highly trained specialists from other fields. The type of work ranges from studies designed to influence important decisions in policy to clarification of troublesome details.

In addition to a group of engineers, the research engineer has a supervision over a statistical section, a recurrent work section, and a budget section.

The statistical section supplies certain statistics required by the operating management, and those needed in the development of research studies. The recurrent work section originally was a group of clerks set aside to do work of such a definitely recurrent nature that the jobs could be scheduled with a fairly reasonable degree of exactness. It was found that, by an extremely simple method consisting of element identification and requirement for reauthorization at reasonable intervals, continuance of any recurrent clerical work, after it had ceased to be profitable, could be avoided. The benefits secured have been so evident that an engineer has been placed temporarily in charge of analysis and studies incident to installation of similar methods in operating departments. The budget section is engaged in formulation of annual operating and improvement budgets and revisions thereof. This section also maintains comparisons of actual performance with budget estimates and conducts such analyses as are deemed necessary to bring out pertinent facts.

The general office division, in charge of an office manager, which performs office service for all operating general offices was combined with the research department for reasons of economy and effectiveness. The department, when first organized, suffered from lack of stenographic assistance. The consolidation has not only corrected this situation by making available a larger and more flexible group, but the orderly method which permeates activities has been beneficial to office operation. There is now one general file which also serves to pre-

Digitized by Google



Systematic examination of underlying facts is essential in determining the soundness of conclusions

serve research material where formerly there were several departmental files.

The responsibility of the research manager consists of achieving co-ordination between the department and other officials of the company as well as among divisions and individuals of the department. He is responsible for the initiation of research projects, their placement in priority, their production, their presentation, and to a degree their consumption. He is chairman of an advisory council which is composed of the heads of the commercial department, department of maintenance and construction, department of traffic and transportation, and the Pittsburgh Motor Coach Company. Placed in this manner on a level with all other department heads who report to the operating vice-president, he has an opportunity to co-ordinate the activities of the research department with all operating activities. The research engineer is chairman of an operating committee composed of operating executives who report to some member of the advisory council. This arrangement further extends the opportunity for co-ordination.

Neither the research manager nor the research engineer has operating authority or operating responsibility. Both are charged, however, with the responsibility to exhaust their efforts to see that all pertinent facts are considered in the discussions over which they preside. Such an attitude of "research-mindedness" on the part of the management of the Pittsburgh Railways has been the dominating factor in the successful operation of the research department.

The Cost of Research Work

Management research, as the Pittsburgh Railways is endeavoring to use it, is not some new experimental thing intact in itself, superimposed upon the former type of operation. It is more nearly a regrouping of service units with certain additions, all of which are operating in a detached research atmosphere. This arrangement was induced by an attitude which admits the existence of rapid change and the necessity of making use of whatever scientific principles experimental research has developed in any field. The net result appears to be simply a concentration of effort and an improved production of usable material for the support of management in dealing with everyday problems. The description of the organization indicates that numerous types of work and service other than the development of purely research studies are performed. It is obvious, therefore, that purely research studies share the burden of overhead costs with other types of service common to all companies.

The cost of actual research work is almost as flexible as the cost of piece work, as its expansion or contraction is governed by work units.

Following is a table showing, in percentages of payroll, how the energies of the department are divided:

Division of Department Energies

	Per Cent
Reports and studies	39
Statistics in support of reports and studies	6
Recurrent statistical and clerical work	13
Budget work	10
Welfare work—investigating cases of unfortunate employees and arranging loans	3
General office service for the vice-president, general superintendent of transportation and traffic, general superintendent ot maintenance and construction, Pittsburgh Motor Coach Company, research department, and file service for commercial department	29

Not all research work of the Pittsburgh Railways is confined to the research department. Technical and experimental work has been continued in departments where it is obviously practical. In such cases individuals have been partly or completely freed from operating responsibilities, and an effort has been made to provide working conditions where detached thought is possible.

A further insight into the activities and scope of the Pittsburgh Railways research department is made possible by examples of specific studies which have either been released or are now in progress:

- Car design
- Fare structures
- Motor coach routes
- Wage agreements
- Trolley bus
- Operating estimates
- Incline operation
- Retirement plan
- Insurance
- Test of air in Mount Washington Tunnel
- Time-keeping methods
- Studies of revenue trends
- Motor coach tests and experiments
- Track relocations
- Safety islands
- Statistical studies

Digitized by Google

While recurrent statistical work can scarcely be termed "research," jobs such as are listed below are done. This is purely clerical work which can be done whenever it is deemed most expedient. It is carefully controlled by identified work units and is made to fit immediate needs of the management. The units recur with sufficient regularity to permit scheduling. The following are typical:

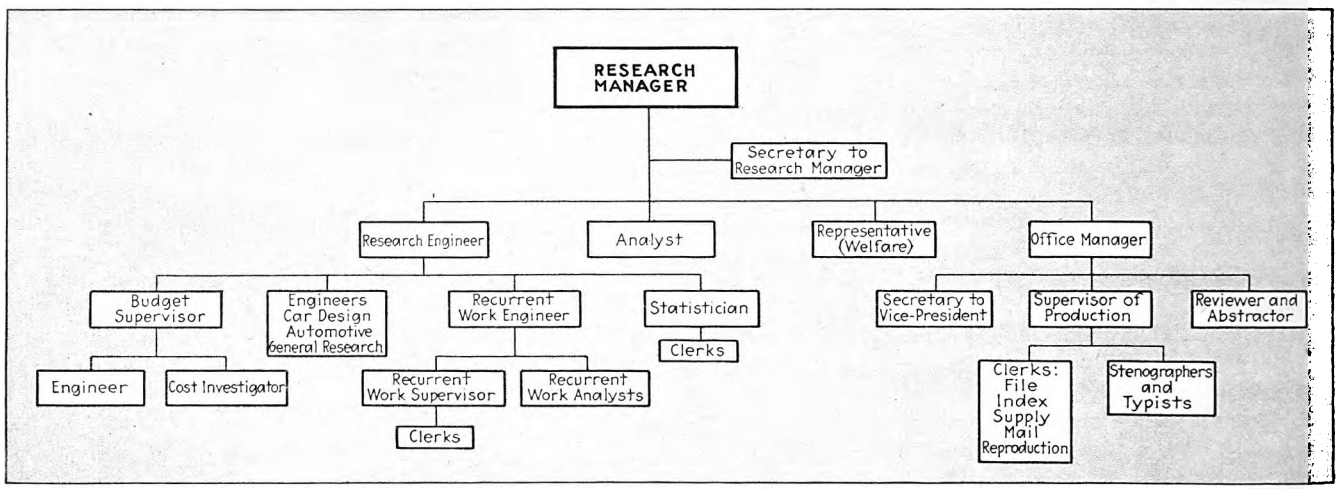
Detailed analysis of operating expenditures.
Analysis of storeroom materials and supplies, withdrawals.
Analysis of complaints and commendations.
Analysis of accidents.
Analysis of car turns.
Analysis of trainmen's wages.
Analysis of time allowed trainmen in excess of scheduled time.
Analysis of sick absenteeism.
Preparation of daily report of car-miles operated—by route.

Sound Production Methods Essential

The opportunities for improving production both as to timeliness and economy through elimination of waste became more and more apparent as the experience of the job or jobs under active production; the second, those jobs waiting for material; the third, four or five jobs chosen with care to move into production next; and the fourth, jobs which are waiting in a selective line for later movement into production. Since the daily priority change involves no clerical work but simply movement from one compartment to another, the time required for maintaining the method is next to nothing.

A project placed in priority is considered as a product to be manufactured and consumed. At no time is there a question in the mind of any employee, his immediate supervisor, or the department manager as to which jobs constitute the employee's immediate, entire responsibility. Establishment of priority is the job of the department head, and whenever it is tossed to one not actually responsible for it, waste is bound to result.

The handling of recurrent work is as carefully organized as that coming under the head of non-routine work. Each item of routine work which may recur with regularity either daily, weekly, or monthly, must carry an



Co-ordination of the research and general office personnel of the Pittsburgh Railways has produced an efficient and economical organization

the department increased. The wastefulness of unsatisfactory work, either because of misunderstanding of objective or other reasons, stimulated serious effort to secure a better understanding of the elements which help or hinder desk-workers. The result has been the creation of methods designed to make the most of helpful factors and to avoid the destructive ones. A research worker cannot achieve reasonably satisfactory production unless his working conditions include at least the following:

1. A common understanding in fact with his supervisor as to the scope of a job, the objective, purpose, and the time factor.

2. The priority of the unit of work given him should be definite. Conflicting demands, where definite priority of units is ignored, destroy the possibility of good jobs. Such is not thought of where the work units are tangible, as in a shop.

When a job comes to the department, it is set up as an identified work unit, entered in a ledger and numbered consecutively. The job is then set up on a small sheet of paper which fits a pocket-sized, loose-leaf note book. The research manager has a book for each worker who is assigned non-routine jobs. The worker and his immediate supervisor have duplicates. The books are divided into compartments, the need for which has been indicated by experience. The first compartment holds authority. This authority is repeated at intervals to obviate the possibility of work being done after its value has passed. The accumulation of useless clerical work is thereby prevented and valuable work is not kept waiting because of unprofitable use of a clerk's time.

Effective Follow-Up Essentials

The research department is non-competitive and makes no attempt to show specific economies and other achievements to which it has contributed. The department's chief aim is to perform a useful service which can only be accomplished by a co-operative effort on the part of recipients of releases to profit by the work done. Consumption does not mean the blind acceptance of a research department release. It does not necessarily mean acceptance at all. But it is the policy of the company that the releases cannot be ignored. If an operator can take issue and support his position, he is expected to do so, and such action is considered to be consumption. If evidence of such use is not apparent in a reasonable time, inquiries are made and follow-up procedure instituted. If necessary, the research manager is expected to formally request consideration of the release, with copies of such request going to other members of the advisory council and to the vice-president. An authorized follow-up procedure is a factor of prime importance in the

Digitized by Google

effectiveness of a research department, and is a definite recognition on the part of management that, if it is to endeavor to base its policies and operation on a factual basis, the results of research effort are all pertinent to the subject involved. The consumer is not only expected to differ, but it is considered his duty to do so if he can justify his position. Furthermore, the research department is expected to welcome conflicting views, and to help secure material to support such opposition—all as a fact-finding effort. But any prospective consumer who fails to do all he can to make the most of the work done by the research department and to exhaust the releases for whatever helpful material they may contain is acting contrary to company policy.

The research department in Pittsburgh has definitely dispelled the general idea that only highly trained technical men are suitable for research work. In highly technical matters, the specialist is required and used, but he is treated as a specialist and is retained for the particular project requiring his services. For the everyday research worker the department depends upon the man of practical intelligence—one who is inclined to develop an accuracy in observation, to draw reasonably sound inferences, and to use good judgment. In addition to this, it is imperative that he develop a persistent concentration which drives him doggedly into his problem. Engineering training is regarded as a distinct asset, but not an assurance of research performance of a high grade. Some individuals who are not engineers are delivering excellent work. The experience of the department points to the value of an attitude which accepts constant change as an inevitable fact and fears both undue emphasis upon particularities and conclusions which may once have been sound but which have become obsolete.

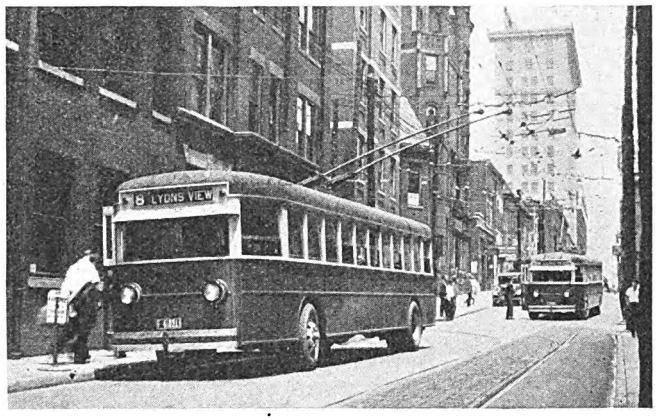
Knoxville Trolley Buses Increase Patronage

FAVORABLE expressions of opinion indicate that the trolley buses placed in service by the Knoxville Power & Light Company on April 28 are being well received by the public. More tangible proof, however, is found in the 15 per cent increase in riding which has occurred on the Lyons View line. Apparently, the patrons are being attracted by the speed, quietness, convenience and flexibility of the new vehicles.

Service on this line previously was given by electric cars which operated through paved streets to the city limits, and from there to the end of the line on open track at the side of the highway. About a year and a half ago the company was faced with the problem of rehabilitating and extending the car line. Subsequently, it was decided by the City Council of Knoxville to undertake street widening and repaving. Negotiations with the company resulted in a decision to remove the track and install trolley buses. Accordingly, four trolley buses, with a seating capacity of 43 passengers each, were ordered from the Cincinnati Car Corporation. Actual service was begun on April 28, 1930.

At the present time, two of the vehicles are used during base hours on a 30-minute headway. During rush periods, all four are used and the headway is reduced to fifteen minutes. Daily vehicle-miles total approximately 527. Because of the higher acceleration and breaking rate, as well as higher free running speeds, the vehicles are able to maintain faster schedules on the line. The former time of one hour and fifteen minutes for the round trip has been reduced to one hour. The average scheduled speed for the run is 10.54 m.p.h.

The route, as shown on the accompanying map, extends from the heart of Knoxville's business district to a point to the southwest, a distance of 5.27 miles. In the business district the vehicles enter on Clinch Street and loop around through Walnut, Union and Gay Streets. The streets are extremely narrow and congested there, but the trolley buses operate satisfactorily, even on the

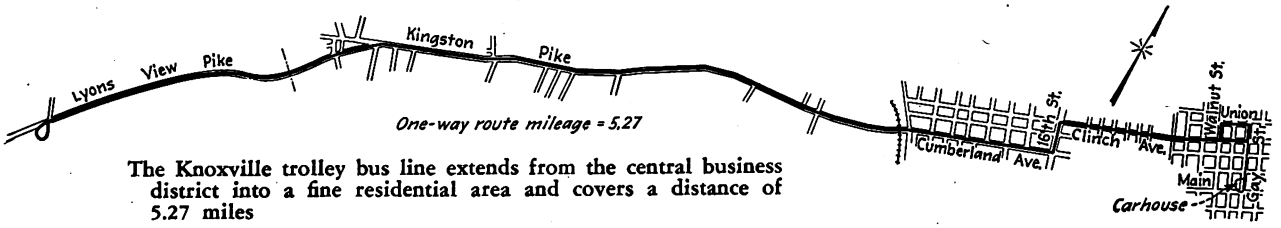


Trolley buses in the business district of Knoxville

sections of the route which are duplicated by street car lines. Downtown the trolley buses use the raised concrete loading zones provided for street car patrons. After leaving the business district the route enters one of the finest residential districts in the city.

In the business district the trolley buses use the same positive contact wire as do the street cars. At intersections where street cars operate straight through and also turn, a special mechanical frog, developed by the Ohio Brass Company, with tongue actuated by a tripping device on the negative wire, is used. As the latter is only used by the bus, the passage of a trolley wheel can be utilized to set the frog tongue in the positive wire. It other instances turnouts are provided with electrically operated frogs.

The vehicles are stored and maintained at the Main Street carhouse which is located 0.14 mile from the regular route at Gay and Clinch Streets. To allow for satisfactory inspection and repair, guards were placed along the sides of one of the car pits and double trolley installed over one track in the repair section.



The Knoxville trolley bus line extends from the central business district into a fine residential area and covers a distance of 5.27 miles

Digitized by Google

Extensive Rehabilitation

Forty new cars of this type were recently placed in service by the Des Moines Railway

Purchase of 50 new cars, complete transformation from two-man to one-man operation, remodeling of all rolling stock, betterment of service, improvement in power system and effecting of major economies among steps taken by new management

By LAURENCE WINGERTER
Publicity Director Des Moines Railway

WITHIN a period of a little more than a year the Des Moines Railway has carried out an improvement program which has included almost every part of its physical plant, and which has affected every phase of its operation. Definite results already realized are lower operating expenses and a better state of public relations. With the return of business conditions to normal it is anticipated that the new equipment, higher speeds and general improvements in service will cause an increase in patronage. With more business and lower expenses, the company should have a satisfactory showing, reflected in the net.

Announcement of the plans followed the purchase of the Des Moines City Railway at the receiver's sale on June 22, 1929, by Walter J. Cummings and Charles G. Adsit. The new company, with the name changed to the Des Moines Railway, was incorporated and took formal possession on July 15. Officers of the company now are Mr. Cummings, chairman of the board, Mr. Adsit, president, and C. W. Gifford, general manager. Mr. Gifford has had direct charge of the rehabilitation.

Of the major moves made by the new management, two are of outstanding importance—the purchase of 50 new cars and the complete change-over from two-man to one-man operation. Previous to the change-over, it was necessary to remodel 101 of the company's cars. In this work, standardized motors and other parts were adopted, new fare registers were installed, many safety devices were added, and other modern equipment installed. Following the purchase of the new cars, 40 street cars of an obsolete type were retired. Among the other steps taken were the speeding up of schedules, merchandising the service, effecting economies and improving the power system.

Ten of the 50 new cars were ordered shortly after the reorganization of the company. They were of the double-truck, single-end type, arranged for one-man operation. Individual leather-upholstered seats were provided and special attention given to interior decorations and lighting.

During the current year, 40 additional cars of modern design, built by the Cummings Car & Coach Company, were delivered. These cars have a well-balanced design, attained by wide-vision windows, a narrow letterboard and a low arched roof. A detailed description of the cars appeared in the July, 1930, issue of ELECTRIC RAILWAY JOURNAL.

SCHEDULED SPEED INCREASED

Coincident with the installation of the new cars and the adoption of one-man operation, the railway increased the number of cars in peak service from 108 to 140, or

Digitized by Google

Places Des Moines in Favorable Position

New standard uniform and cap of special blue-gray fabric which replaced the old standard blue serge suit and stiff cap used for many years

30 per cent, shortened the headways, and speeded up its schedules. All one-man schedules, both base and peak, are as fast as, or faster than, the two-man schedules of the same line. Weighted averages show an increase from 11.11 to 11.61 m.p.h. for base hours, and an increase from 10.84 to 10.97 m.p.h. for peak periods. Likewise, all headways were shortened or remained the same. Reductions on certain lines were as great as four minutes in base operation, five minutes in the afternoon and two minutes in the peak.

Express cars, operated by one man, have been inaugurated on several lines, and have proved popular with the riding public. In the near future the company plans to extend express service to every route where existing track facilities permit.

For busy lines, where cars are only two and three minutes apart during rush hours, company engineers have developed a novel plan, to be tried soon, known as "relay express service." In starting the system an extra car will be placed in service near the outer end of a line and run as express, making no stops to pick up passengers, until it overtakes the car immediately ahead. Then, upon exchanging pre-arranged signals, the first car will become an express and the second car a local.

Cars are being equipped with field tappers to increase the speed, and quick application valves have been installed to reduce the time of stopping. Electric track switches and new automatic signals have been installed as additional time-savers, and two snow sweepers have been purchased to speed the clearing of lines in winter.

Efforts to merchandise the service have included the adoption of new trainmen uniforms, instruction in selling of rides, the creation of a company publicity department, and the adoption of a new transfer system. All publicity now originates in the company. By adopting an open attitude a friendly relationship has been built up with the press. News stories regarding company affairs are sent to all daily and community newspapers, giving correct accounts to the readers.

In all newspaper advertising two points are stressed—economy and service. And in every case the psychology is followed that "Almost everybody's riding with us. Why not you?" A typical economy advertisement, one of eight in a thrift series, is illustrated. Several other media are used for advertising—inside car cards, front and rear dash posters, the latter proving effective for directing messages to motorists, billboards, radio, direct mail, city maps, pamphlets and a car which is given new messages for the public every 3 months. The theaters run trailers in exchange for advertising of current movies on the cars. Another co-operative plan is the giving of a weekly pass with information about the service to new families in the city, along with gifts from various sponsors, distributed by a "hostess" in her "welcome wagon." A follow-up letter is mailed later to ask if the service has been satisfactory.

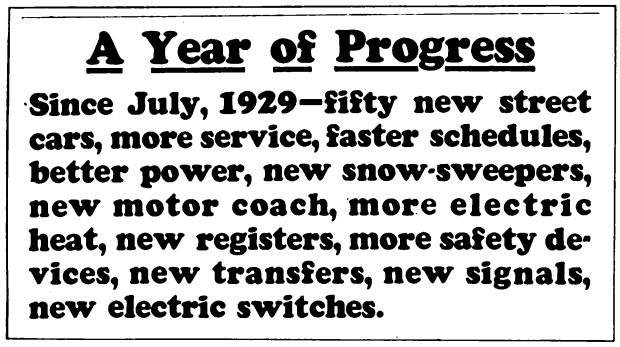
Example of newspaper advertising, stressing the thrift of riding cars

Power Distribution System Improved

Three projects were included in the program for bettering the power supply—the complete rehabilitation of the power plant, the stringing of new feeder cables, and the construction of a new substation. Improvements in the railway's 14,000-kw. power plant included the installation of vertical baffles and Dietrich arches in all boilers, and the purchase of additional gages, pumps and auxiliary devices for regulating generation. Better firing, more efficient boiler conditions and increased economy have resulted. A total of 5,000 ft. of 500,000 circ.mil copper feeder cable was strung on the Sevastapol line, increasing trolley voltage and lowering operating cost. With the new feeders, car speeds were increased

Digitized by Google

and peak headways were reduced from fifteen to thirteen minutes without the use of additional cars. The new substation was constructed at the West 24th Street carhouse. Special transformer and rotary rooms were constructed, and a 1,000-kw. synchronous converter was placed in service. Following this change 6,000 ft. of additional feeder cable was strung and power conditions were improved on three lines.



Inside car poster, depicting the progress made by the company during the year

Major economies, aside from those effected by the use of new cars and the adoption of one-man operation, have been brought about by the consolidation of departments, elimination of the all-day line trouble crew, suspension of the bridge crew, replacement of advertising agency with a company publicity department, elimination of supervisors' automobiles, and installation of storage gasoline tanks for bus fuel. In the consolidation, the purchasing and stores departments, the power plant and car shop mechanical departments, the auto and bus repair shops, and the power plant and substation departments, were combined, respectively. It is significant that operating costs have been reduced from 28 cents, including depreciation, to 23 cents per car-mile.

Opposition to One-Man Operation

Complete transformation of service and equipment from 100 per cent two-man operation to entire one-man operation was the task required of, and accomplished by, the Des Moines Railway in the short period of six months. One hundred and one cars were remodeled between Feb. 15 and June 1, 1930, the first actual one-man service was started on July 4, and 100 per cent one-man operation was completed on Aug. 18.

Serious political opposition and objection from the trade unions presented a real problem for the company. During a political campaign in March, 1930, pledges opposing one-man operation were secured from all candidates for election to the City Council. Petitions opposing the substitution also came to light in various portions of the city and were presented to the Council, along with a suggested draft of an ordinance designed to prohibit one-man cars. On April 24 the first reading of the anti-one-man car ordinance was passed by the Council.

Meanwhile, the railway launched a campaign of education in which the merits of one-man operation were explained in talks to luncheon clubs and community organizations, and by car card and newspaper advertising. This was supplemented with a successful drive to secure a counter petition through the efforts of foremen and office employees. Presentation of this counter-petition and resolutions of various clubs and civic groups to the City Council changed the attitude of this body.

During this period, the entire rolling stock of the company, with the exception of 40 obsolete cars doomed for the scrap heap, was being overhauled for immediate one-man operation. As the cars were completed they were placed in regular service with two men on each car. The conductor, however, was stationed on the front platform and passengers used the treadle exits at the center or the rear. This procedure acquainted the public with the features of safety cars, demonstrated that a second man was not necessary and enabled the company to instruct a majority of its trainmen in the use of the new equipment. On June 30, the City Council decided to postpone any action on the proposed anti-one-man ordinance for a period of at least six months. This action provided the company with the desired opportunity to demonstrate the efficacy of one-man service, and, accordingly, two lines were converted on July 4. Other lines were changed as rapidly as possible, and by Aug. 18, one-man operation had been extended to the entire fifteen lines.

Problems in Remodeling Equipment

Many interesting problems attended the conversion of the 101 cars, of which there were five distinct types. Forty cars had double entrance doors in the center and single exit doors in front. Fifteen cars had an extremely small drop platform on the front and a large drop platform on the rear. Twenty-six cars had drop platforms of equal length front and rear, while the remaining twenty, of two different types, had platforms of modern ramp design. All cars were single end, double truck.

The rehabilitation was begun simultaneously at two locations. At the company's main shop, extra carpenters, machinists, painters and electricians were hired. At a second location, where shop facilities were provided, a group of men from the Cummings Car & Coach Company assisted in the work.

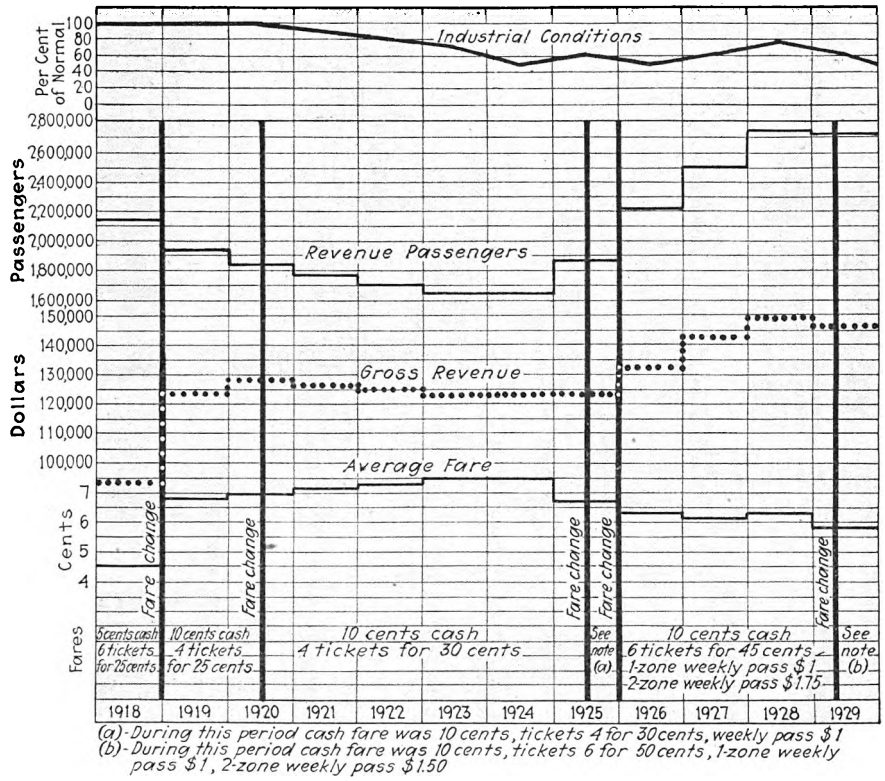
It was decided to install every practical modern safety device and to standardize the equipment and controls to the fullest extent. It is worthy of note that all active cars of the company now use the same type of motor, thereby reducing stores and maintenance expense.

Included in the specifications were treadle-operated exit doors, automatic door-reversing mechanisms, ample rubber at sides and bottoms of doors, anti-pinch devices between door leaves, quick release and quick application valves, emergency valves, hand and foot dead-man control, signal lights, inside and outside mirrors and rear-end reverse control. The fare registration system was changed with the advent of one-man service, and new Ohmer registers were installed on all remodeled cars.

Controllers were moved as far to the left as possible and air valves were located approximately in the center, giving ample room for boarding passengers. Copper tubing was used extensively for piping. For convenience in maintaining air equipment, a single compact unit, comprising the quick release valve, emergency valve, double check valve, magnet valve and air contactor, was located conveniently at the front.

From a transportation standpoint, the change-over to complete one-man operation in six weeks presented a huge problem. Previous to the first substitution on July 4, all men had been instructed in the operation of the new equipment. Special supervisors remained with all trainmen until they were deemed competent to operate the cars alone. By beginning operation with comparatively light Sunday riding, operators were enabled to become acquainted with their duties before the weekday rush.

Digitized by Google



(a)-During this period cash fare was 10 cents, tickets 4 for 30 cents, weekly pass $1
(b)-During this period cash fare was 10 cents, tickets 6 for 50 cents, 1-zone weekly pass $1, 2-zone weekly pass $1.50

During a period when industrial conditions were below normal gross revenue and number of passengers carried have increased as the average fare has decreased

HIGHER REVENUE

With Lower Fares

How a small electric railway has popularized its service by readjusting its rates to meet changed conditions

NOTEWORTHY increases in gross revenue and in the number of passengers carried have been effected by readjusting rates of fare to meet changed conditions in the territory served by one small electric railway. The present average fare is 15 per cent below that of 1919, while the gross revenue is nearly 20 per cent higher. The number of passengers carried last year was approximately 30 per cent greater than in 1919. In the opinion of the management, the success which it has had in building up traffic has been due primarily to the adoption of rates of fare which encourage the use of its service.

For many years prior to 1919 this railway operated on a 5-cent cash fare with six tickets for 25 cents. Under these rates about 75 per cent of the passengers used tickets. War-time conditions necessitated an increase at the beginning of that year to 10 cents cash with four tickets for 25 cents. Thus for the first time a marked differential was created between the fares paid by the casual rider and the regular rider. This differential increased the use of tickets to 90 per cent. The principle of lower fares for regular riders established at that time became the basis of the "merchandising rates" subsequently adopted.

Operating costs continued to rise, however, and in 1920 the ticket rate was increased to four for 30 cents, while the cash fare continued unchanged. This reduced the differential somewhat, but it remained large enough to attract about the same per cent of patrons.

During the next several years the management gave close attention to the subject of fares. It was felt that the users of the service represented three distinct classes: (1) casual riders, (2) intermittent riders, and (3) regular daily riders. Since the riding habit of each class

Digitized by Google

Passengers Carried

Year	Cash Fares	Tickets	Passes	Tickets and Passes	Total
1918	537,780	1,603,888	.....	.....	2,141,668
1919	162,248	1,784,532	.....	.....	1,946,780
1920	161,653	1,678,600	.....	.....	1,840,253
1923	232,065	1,416,090	.....	.....	1,648,155
1924	222,643	1,433,552	.....	.....	1,656,195
1925	216,420	1,287,744	377,047	1,664,791	1,881,311
1926	295,851	1,078,301	853,515	1,931,816	2,227,667
1927	324,781	1,065,182	1,116,865	2,182,047	2,506,828
1928	346,847	1,077,665	1,306,147	2,383,813	2,730,660
1929	326,317	964,902	1,428,871	2,393,773	2,720,092

Sources of Revenue—Per Cent

	1923	1924	1925	1926	1927	1928	1929
Cash	18.7	17.8	17.4	22.3	22.8	23.0	22.2
Tickets	81.3	82.2	73.0	56.9	51.4	49.0	46.6
Passes	....	....	9.6	20.8	25.8	28.0	31.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Classification of Passengers—Per Cent

	1923	1924	1925	1926	1927	1928	1929
Cash	14.0	13.3	11.5	13.3	13.0	12.7	12.0
Tickets	86.0	86.7	68.4	48.4	42.6	39.5	35.5
Passes	....	....	20.1	38.3	44.4	47.8	52.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

was different from that of the other classes, it was thought that each should have a rate of fare suited to its own needs. Meanwhile, automobile competition was having a serious effect upon the railway's traffic. The problem was submitted to the Public Service Commission for its consideration, with the result that authority was granted to charge any desired rate of fare up to and including 10 cents in any one zone.

Three routes are operated by this railway over a total of 12.5 miles of track. Of this trackage approximately a quarter of a mile is common to all three lines, one of which is 2 miles long, a second is 3 miles, and the third, 8 miles. Each of the short lines has a single zone, while the long line is divided into two zones. Four municipalities, with a total population of 22,000, are served.

The first step in adjusting rates to meet the needs of different classes of riders was the adoption of the weekly pass in 1925. This pass, which was valid only on the short lines, was sold for $1. Figures for the year 1925, during which the new rate was in effect for about six months, show that a downward trend in revenue was checked so effectively that the total for the year was about the same as for 1924, while the number of passengers carried increased to a marked extent.

Use of the weekly pass on the short lines aroused a strong desire on the part of the patrons of the two-zone line to have the use of the weekly pass extended to their service. Early in 1926 the management consented to this plan, and the regular $1 weekly pass was made applicable to the first zone of the long line. A universal weekly pass covering all zones on all lines was established at a price of $1.75. At the same time the ticket rate was changed from four for 30 cents to six for 45 cents, it being thought that the necessity to buy tickets in larger quantities would stimulate the sale of its passes. The effect of these changes was to increase both the number of passengers carried and the gross revenue. At the same time the average fare was reduced.

During the latter part of 1929 industrial conditions became seriously depressed in the territory served by this railway and riding began to be curtailed. Another change was then made in the fare schedule, the ticket rate being increased to six for 50 cents and the price of the universal pass reduced from $1.75 to $1.50. While this did not entirely stop the decrease in riding, it was successful in checking it to a considerable extent, as shown by the figures shown in the table below.

During the first seven months of the present year the revenue decreased about 7½ per cent. Cash and ticket revenue decreased greatly, while pass revenue increased moderately. In the opinion of the management this result furnishes good indication of the value of the change in rates.

Advantages of the merchandising fare scale used by this railway are believed to be that it has popularized the company and its service, has brought back to the street cars a substantial amount of traffic which formerly used private automobiles, and has secured the maximum available revenue. Investigation has disclosed that approximately 65 per cent of the pass rides are taken during off-peak hours and only 35 per cent in the rush hours.

Effect of Fare Changes Made in 1929

	7½ Cent Ticket Revenue	Loss	Pass Revenue	Gain	Total Loss
January to June 30 Before Change					
1928	$35,296		$21,302		
1929	33,382	$1,914	21,764	$462	$1,454
July to December 31 After Change					
1928	$34,371		$20,949		
1929	30,924	$3,437	23,934	$2,985	$452

Note—Change in fare scale was from six tickets for 45 cents to six tickets for 50 cents, and three-zone pass from $1.75 to $1.50.

Several methods have been adopted to popularize the pass. During the Christmas holiday week, when many industries are shut down and pass sales would ordinarily decrease sharply, the management adopted the plan of giving away a leather card case in which the pass could be carried. Another method adopted has been to give free passes for the following week to five out of every 100 buyers. Individual pass holders who receive them are selected by drawing numbers out of a hat. Winning numbers and names are published in local newspapers.

Along with its merchandising fare scale, the railway has adopted numerous other means of popularizing its service. It has adopted a new color scheme for its cars, has made innovations in the way of leather upholstery, rubber tile flooring, aluminum fittings, etc. It has also done effective publicity work in a bulletin which it distributes on the cars and in the newspapers of the territory. In the opinion of the management, however, the most important single factor in building up the traffic has been the adoption of the merchandising fare scale.

Sources of Revenue

Year	Cash Fares	Tickets	Passes	Tickets and Passes	Total	Rates of Fare: Cash	Tickets	Passes
1918	$26,889	$65,385	....	.....	$92,274	5 cents	Six for 25 cents	
1919	16,224	108,278	....	.....	124,502	10 cents	Four for 25 cents (In force first of year)	
1920	16,165	111,620	....	.....	127,785	10 cents	Four for 30 cents (In force six months only)	
1923	23,206	100,896	....	.....	124,103	10 cents	Four for 30 cents	
1924	22,264	102,291	....	.....	124,555	10 cents	Four for 30 cents	
1925	21,642	90,684	$11,956	$102,640	124,282	10 cents	Four for 30 cents	$1.00
1926	29,585	75,475	27,818	103,293	132,378	10 cents	Six for 45 cents	$1.00 and $1.75
1927	32,478	73,402	36,704	110,106	142,584	10 cents	Six for 45 cents	1.00 and 1.75
1928	34,685	73,878	42,251	116,130	150,814	10 cents	Six for 45 cents	1.00 and 1.75
1929	32,632	68,571	45,698	114,269	146,901	10 cents	Six for 45 cents	1.00 and 1.50

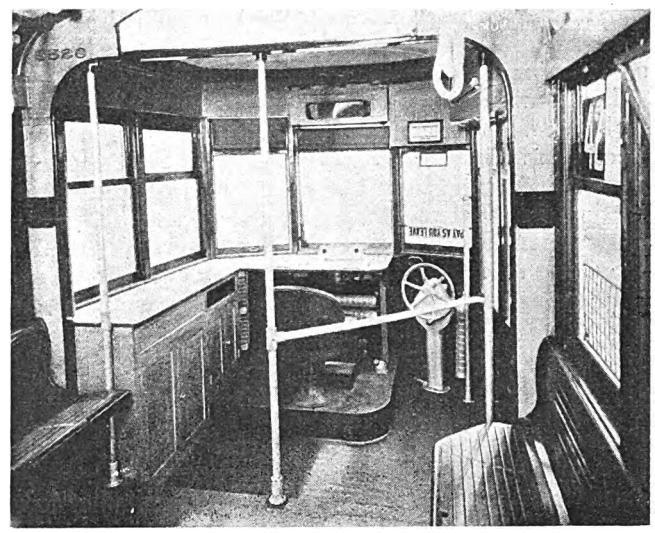
Digitized by Google

Philadelphia Sample Car

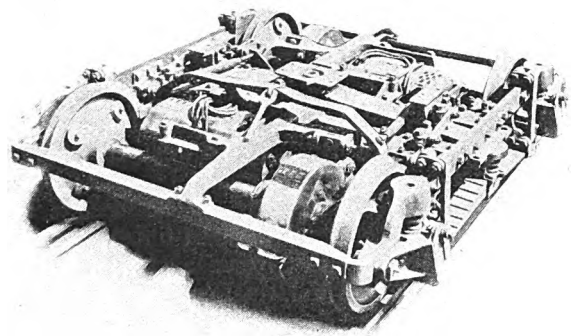
Uses Single-Reduction Drive With High-Speed Motors and Magnetic Brakes

DESIGN of a street car of a new type was undertaken by engineers of the Philadelphia Rapid Transit Company with the purpose of obtaining faster acceleration and braking, placing of more of the operating equipment under a control board and arrangement for efficient operation by one man. In its present form the design of trucks and control equipment has been worked out and the parts have been mounted on one of the existing cars of the company.

The appearance of the front platform is shown in an accompanying illustration. The operator sits on a stool which is secured to a platform raised about 10 in., or the same level as the car floor. The motors and brakes are controlled by pedals, while the doors are controlled by small hand levers which actuate the door engines. Directly in front of the operator, mounted on the control desk, is a panel containing the air-brake gages and signal lights for his information. The electric fare register may be operated either from a lever on the control board or from a pedal at the right of the brake and reverse pedals. The necessary switches and fuses are within easy reach inclosed in a cabinet conveniently placed at the left of the operator's position.



In the sample Philadelphia car the control equipment is assembled in a cabinet convenient to the car operator. Foot control and brake are used.



Single-reduction gearing with a ratio of 7.2 to 1 and flexibly mounted motors are features of the Brill truck used in the Philadelphia car

While the standard exterior painting scheme of bronze green and cream is retained for the exterior, the interior is finished in a light apple green, stippled on a white background, making a very pleasing appearance.

Chief interest in the car centers on the driving and braking equipment. The car is mounted on two Brill No. 84-E trucks which were designed for light weight and to provide sufficient space for mounting a pair of motors with single reduction drive.

Fundamentally the trucks follow standard practice, the bolsters being of cast-steel section with integral pads for center and side bearings and with pockets cast in each end to receive the tops of the coil springs of the graduated spring system. There is a long coil spring imposed between the pocket in the end of the bolster casting and the center of the longitudinal leaf spring, the outer ends of which are supported from the truck side frame through twin link hangers. The forged side frames are modified to take the new compensating wing-type journal boxes. These are attached to drop extensions of the side frames beyond the axles. The boxes are pivotally supported from the side frames by hardened bushed bolts. This reduces the number of parts as compared with the pedestal type, eliminating attendant wear and noise, and producing even shoe wear. The journal bearings are of babbitt-lined brass without wedges.

The truck transoms are of structural steel angles spaced on each end of the bolster and supported from the side frames by flanged gusset plates with driven bolts. End frames of the same material are bolted to projections of the side frames. The wheel-brake rigging is of the conventional type supported on half ball hangers. The shoes are inside hung with a one-piece brake beam. Lubrication is with high-pressure grease fittings. The axles are of the A.E.R.E.A. standard type and are designed to take the single-reduction gear unit. The wheels are of rolled steel of 26-in. diameter. Four silencing blocks of wood are attached to each wheel.

Two unusual features of the truck are a self-contained single-reduction drive made by the Tool Steel Gear & Pinion Company, and auxiliary magnetic rail brakes. The drive consists of a single gear and pinion with a ratio of 7.2 to 1. The gears are made of alloy steel, having spur teeth with a smaller face and pitch than is usual with standard motor drive. This gives sufficient road clearance with 26-in. wheels. The gear is mounted on the axle with plain brass bearings, while the pinion is mounted on roller bearings. Both of these are self-

Digitized by Google

contained in an oil-tight split aluminum housing mounted on the axle and supported at the pinion end by a trunnion link.

The motor equipment on each truck consists of two GE-298-H high-speed motors placed transversely between the axles and the truck transom. These are connected to the reduction gearing through a double universal coupling. On one truck the coupling is made of flexible disks, while on the other truck there is a short shaft with universal joint. The motor and pinion end of the gear unit is flexibly supported from the truck frame by a cast-steel spider extending from the transoms to the end frames on approximately the longitudinal center of the truck, and with extending arms to accept the motor mounting and pivotal end of the trunnion link.

For additional safety during emergency stops from high speeds, the trucks are fitted with magnetic rail brakes located in individual housings over each rail between the wheels and hung from the transoms and transom supporting plates of the trucks. The magnetic shoes when inoperative are carried approximately 1½ in. to 2 in. above the rail. Each is equipped with two air cylinders with spring return and carries the magnet coils for energizing.

The two air cylinders on each magnetic brake are piped together and are connected to a cross pipe which is attached to the top of the transom angle with a connection at the center of the truck to the body air-brake piping. This connection is a looped air hose supported on the truck and body in a manner similar to the motor leads. The air piping is of copper tubing, and by the arrangement described permits equalization of air in all the cylinders.

Dimensions and Weights of Car Trucks

Wheelbase	5 ft. 6 in.
Track gage	2 ft. 2½ in.
Distance between centers of side frames	6 ft. 4 in.
Wheel diameter	26 in.
Wheel tread	2½ in.
Flange height	¾ in.
Flange thickness	1 in.
Size of journals (MCB type)	3¼x7 in.

Weights:	Front	Rear
Four wheels, lb	1,020	1,020
Two axles, lb	712	712
Truck frame, lb	3,486	3,486
Two motors, lb	1,820	1,820
Two speed reducers, including gears, pinions, housings and links, lb	502	502
Two disk couplers, lb	64	85
Magnetic brake guide, lb	160	160
Magnetic brakes and fittings, lb	440	440
Total weight, lb	8,204	8,225
Total weight for two trucks, lb	16,429	

While the magnetic brakes may be used separately if desired, in an emergency application both wheel air brakes and rail magnetic brake are set at the same time. When this is done the stopping distance and time are greatly reduced. In applying the brakes, the first movement of the shoe toward the rail is effected by passage of the air into the cylinders, which forces the shoe within magnetic contact distance of the rail. At the same time the coils are energized and the shoes are pulled to the rail, by magnetic attraction, the remaining distance of ¼ to ⅜ in. The magnetic drag of the shoe on the rail lasts for a predetermined time, with automatic release by cutting off the current to the shoe, which then returns to its original position through the pressure of piston springs.

Washington Experiments with Street Markers

WHITE rubber insets are the latest of a number of devices to be tried by the Washington Traffic Bureau with the aim of developing a satisfactory traffic lane marker. Two street corner installations of this kind have just been made at busy intersections for test purposes. The insets are in the shape of a rectangular box with slanting sides, 3 in. wide by 2 ft. long by 3 in. deep, the depth apparently being made to conform to the average 3-in. depth of asphaltic pavings. The rubber box is filled with asphaltic material similar to that of the paving and bedded in a trench cut in the road. Additional paving material is placed around the edges of the inset, to present a smooth surface. Holes are provided in the sides of the box through which the filler material may bind with the roadbed asphaltum.

Though the insets appear to keep their white surface characteristic and are expected to be as permanent as the roadbed in which they are incorporated, the disadvantages of an expensive installation and a somewhat disrupted paving surface are attached to their use. As the asphalt filler material cannot be compressed to the same density as the pavement, it is believed that the action of trucks and heavy vehicles constantly crossing it will press it below the level of the pavement. A cold asphaltic concrete filler was first tried out in a coarse aggregate pavement, with indifferent action. Better results were obtained with hot sheet asphalt. Another objection, which also applies to Monel metal buttons, is that they constitute a permanent installation at some expense which would be totally lost when the roadbed is to be replaced. Such replacement occurs at the rate of 300,000 sq.yd. annually in the District of Columbia.

White paint of the latest specifications furnished by the Bureau of Standards has proved itself a cheap and practical means of marking, except when paint machines are to be used. Paint probably will be extensively utilized for many years, being gradually replaced by more permanent marking. Specifications call for approximately 20 per cent zinc oxide, 65 per cent lithophone, and 15 per cent other paint pigments, mixed with thin varnish. These proportions give a brilliant and durable white finish, which dries within an hour. The paint, however, is somewhat sticky for machine use.

Strips of white canvas on rubber mat backings were tested in the effort to find a practical and permanent form of marker. It was found that insufficient traction was exerted by the rubber mats to hold the canvas in place, resulting in large sections of the marker being torn up by the sudden braking of wheels, or being distorted into zig-zag lines.

Another device tried was a patented white cement filler, somewhat similar to "roadrite," which was placed in a shallow trench dug right along the lines of a cross lane. This material depressed below the level of the pavement and discolored within a week.

Despite continued experiments with other forms of guides, Monel metal buttons have thus far proved to be the most satisfactory traffic marker, according to M. O. Eldridge, assistant traffic director. They will be installed on cross lanes throughout Washington as fast as funds allow. Traffic plans contemplate the installation of the buttons and metal strips on some of the main boulevards, and, eventually, in parallel lanes to aid in the elimination of traffic weaving.

Digitized by Google

CO-ORDINATION OF TRANSIT FACILITIES

Proposed for St. Louis

Special commission recommends that one management run all car and bus lines. Improvements that can be made in surface transportation should defer the need of rapid transit for some time.

FOR the past two years a transportation survey commission, created by the City Council of St. Louis in June, 1928, has been investigating conditions covering all phases of transportation, traffic and matters related thereto in the city. Specifically included in its duties were investigation of general street and highway plans and related matters; mass and public transportation, including rapid transit, street railway and bus service; taxicabs and service cars; the ways and means whereby the co-ordination and operation of such transportation facilities shall be brought about and covered for the benefit of the public, and relief of general traffic congestion. E. J. Russell, of Mauran, Russell & Crowell, architects, was appointed chairman of the commission. The Mayor, other prominent city officials and business men, including one of the state public service commissioners and the president of the St. Louis Public Service Company, were members.

The commission selected Kelker, De Leuw & Company to conduct the actual survey. This firm submitted eleven reports. These included plans for improving and co-ordinating existing transportation facilities; a rapid transit plan; a detailed survey of traffic conditions; and drafts of several tentative ordinances and legislative bills for consummation of the plans.

When the commission was created there was a widespread belief in St. Louis that rapid transit was necessary immediately. Accordingly, the first investigation was that of a system to comprise (1) high-speed radial rapid transit lines with limited stops for long-haul traffic; (2) local street railway lines feeding the rapid transit lines, and (3) local motor bus lines serving as feeders to street cars and rapid transit lines and providing extensions in sparsely settled districts.

At the outset, the consulting engineers recommended that one company should acquire and operate all of the existing local subways and elevated structures. Further study showed that many advantages would result if all local transportation facilities could be co-ordinated and operated under one management. Since in an extended program for improvements and additions the problem of financing becomes of paramount importance, it was decided to base the unified transit system upon a terminable permit with necessary safeguards.

Financing of rapid transit lines presented additional difficulties. It was pointed out that elevated railroad construction requires about 25 times the capital necessary for street car tracks, and subways approximately 50 times as much. Accordingly, if the entire cost of rapid transit structures is to be borne by the car rider, the portion of his fare necessary for fixed charges would impose an undue burden on him. As a result of the studies, it was concluded that when rapid transit lines in St. Louis are built they should be financed in part by special assessments.

A survey of the street railway service convinced the engineers that it is susceptible of many improvements, making it possible to defer expensive rapid transit construction. Checks of the actual running time showed that some of the causes for the slow movement of street cars were narrowness of the streets, parking of automobiles, density of traffic on intersecting streets, short distances between street intersections, old type cars requiring too much time for loading and unloading, and too many stops.

With the majority of the lines of the Public Service Company equipped with cars suitable for mass transportation, with stopping places reduced to an average of eight per mile (660 ft.), with more direct routes in the intermediate and outlying districts, and with improved routing downtown, it was held that the running time could be materially reduced and kept within a reasonable time for travel to and from business or employment for a number of years to come.

Changes in routing of several of the street railway lines were recommended at an estimated cost for new tangent track and special work of $726,000. Left turns would be reduced 82 per cent by the proposed routing.

Street Car and Bus Co-ordination Urged

Following up their theory that so many improvements could be made in the existing transportation facilities as to defer the necessity for rapid transit facilities, the engineers submitted a plan for the co-ordination of street railway and motor bus service. Wasteful duplication of service was found in many sections of the city. In the rush hours, the bus company does not satisfy the demands, and the overflow traffic must be handled by street cars. For this reason, the number of cars in the rush hours is more than three times those during the non-rush. This has an important and direct bearing on the rate of fare. The street cars were found to maintain a more frequent service, and although on the average they handle more than twice as many passengers per vehicle-mile as do the buses, their average speed is equally fast.

Because of their flexibility, the engineers believe that

Digitized by Google

buses can be used to advantage to provide radial express service within about 3 miles from the business center. In general, the plan proposes that, where an existing street car route closely parallels an existing bus route, the bus line should be abandoned or changed to express service. Where express service is to be furnished by motor buses, the existing equipment should be used only until more suitable buses can be substituted.

It was generally agreed by the commission that new capital must be obtained for any major improvements. This flow of capital to St. Louis will likely be determined largely by the terms and conditions under which the several companies operate. Accordingly, an ordinance was drafted by the engineers incorporating the fundamental principles of service at cost. Under this the company would be allowed to charge to the cost of the service: (1) operating expenses, including taxes; (2) payments into authorized reserve funds; (3) a fixed return on the initial capital value, which would be equivalent to the city purchase price; (4) a return equivalent to the cost of money for extensions and additions; (5) compensation to the city; (6) compensation to the company. Any surplus would form a barometer fund.

Compensation received by the city might be used: (1) to acquire any bonds represented in the initial capital value; (2) to purchase any extension bonds at par on issue; (3) to commute fares by paying any deficits arising from operation into the barometer fare fund, or any other agreed method.

The city and company, by agreement, would determine the following items for insertion in the ordinance, subject to any necessary approval by the state commission: (1) initial capital value; (2) initial rates of fare; (3) initial percentages of gross receipts to be paid into the reserve fund; (4) appointment by the Mayor of a transit commissioner with general supervision over the operation and accounting of the company; (5) co-ordination of the city and suburban services furnished by the company. The recommended term of the franchise was 50 years—the maximum provided by the city charter—with provisions for renewal and with an option for the city to purchase before that time.

A report on the transportation needs of St. Louis covered the possible improvements in the transportation facilities, traffic regulations and street system. These improvements, the engineers estimated, would require capital expenditures of about $23,800,000 during the succeeding five years.

Five recommended methods of obtaining faster, more comfortable and more convenient street railway service included a comprehensive re-routing, a reduction in the number of stopping places, purchase of modern cars, installation of additional feeder bus lines, and extensions of street car lines.

At present there are about 1,350 street cars on the system, of which only 250 are modern. It was recommended that approximately 800 modern cars be substituted, especially on the lines running into or through congested areas, 400 for replacement of present equipment and the remainder as additions. Purchase of these would involve a capital expenditure of about $12,800,000. Car line extensions on six streets were recommended at a cost of about $1,338,000. Fifty buses were recommended as additions to the present feeder bus lines to serve districts of the city not now adequately served. The estimated cost, including garages, was about $512,000. All these expenditures for improvements should be spread over five years, $4,800,000 in each of the first three years, and $4,700,000 in each of the last two.

Between 350 and 400 "service cars," which are private automobiles carrying passengers for hire, operate over approximately 50 route-miles, and charge fares from 15 to 25 cents a person. The engineers found many objections to their use and recommended the substitution of small, high-speed, de luxe buses.

Studies of a rapid transit plan indicated that subways for street cars in the business district would not provide traffic relief in keeping with their cost, would be of little benefit to street car patrons, and other and less costly means of traffic can and should be employed to the fullest extent. A comprehensive rapid transit plan to meet future needs should be adopted now and be constructed as and when any of the routes are necessary and can be financed. Rapid transit structures preferably should be located under or upon wide streets or highways which have space for such structures, thus obviating the expense of procuring a private right-of-way.

Rapid transit lines proposed for future construction, all double track, include (1) a line from the city limits along Manchester Avenue, Chouteau Avenue, Broadway, Cass Avenue and Easton Avenue to the city limits; (2) from the city limits along Gravois Avenue, Ninth Street, Fourteenth Street, Twentieth Street and Florissant Avenue to the city limits; (3) from the city limits along Delmar Avenue and Olive Street to a suitable terminal east of Third Street; (4) from a connection with the Gravois Avenue line along Compton Avenue and Michigan Avenue to Tesson Street.

It was estimated that if these lines were all constructed as subways, the modified plan, as proposed by the engineers, would cost $214,331,000. If subways were used extending to the outer limits on the first and second step proposed in 1926, with elevated structures beyond that, the total cost would be $144,929,000, and if subways were used to the outer limits of the first step only and elevated beyond, the total cost would be $87,052,000.

For traffic regulation and control the installation of traffic signals at 90 intersections in the business district and 88 in the intermediate and outlying districts was recommended at an estimated cost of $279,000. One hundred safety zones of the concrete platform type and upward of 200 of the metal mushroom type were proposed at an estimated cost of $65,000. Prohibition of parking in the business district during business hours is inevitable, states the reports.

Besides the reports of the commission's engineers, several communications from others are included. Stanley Clark, president of the St. Louis Public Service Company and a member of the commission, proposed immediate construction of street car subways in the downtown district. Two plans of re-routing cars are also proposed. In general, these recommendations are along lines similar to those of the commission's engineers.

Widening of a number of existing streets and construction of some new streets in and adjacent to the present business district are recommended. It is proposed that some of the streets, particularly near the river, be double-decked. It is stated that the plans, as proposed, will stop shifting of the business district, stabilize property values at its eastern end, and assist traffic circulation throughout the city.

Minority reports were presented by two members of the commission. Both of these members dissented principally from the idea of granting a terminable permit to the operating company. In practically all other matters these two members concurred in the report.

Digitized by Google

Although Public Service Co-ordinated Transport operates more than 500 buses in Newark, it continues to operate approximately 450 electric cars. Company officials estimate that 1,000 additional buses would be required to take the place of these cars, and believe that the consequent congestion would be intolerable

How Public Service Co-ordinated Transport uses buses to supplement and extend rail service and to replace single-track lines. In larger cities the electric car remains the backbone of the system. This article is based on a paper recently presented before the Transportation Group of the New York Section A.I.E.E.

Development of the Bus for

Mass Transportation

By

A. T. WARNER

General Manager in Charge of Traffic

Public Service Co-ordinated Transport, Newark, N. J.

STREET car operating men, who were brought up on the theory that public transportation must be safe, are largely responsible for the rapid development of the motor-driven bus. When the vehicle was first placed in their hands as a medium to care for their patrons, its safety was so questionable, the operation was so uncertain and unstable, that they demanded of the manufacturers and automotive engineers immediate developments which would make the bus a safer vehicle for the highways.

The bus of 1922 was a far cry from those which we are placing on the highways today. It was a truck chassis with a passenger body on it. It had a four-cylinder motor which was designed for truck use and totally unfit for the frequent stops and starts, the high acceleration desired, and other characteristics inherent in bus operation. Many of the vehicles were equipped with hard tires, and even pneumatics were high-pressure and single in the rear; the body was high, with three and sometimes four steps; springs were such that there was a "kick-up" toward the rear; seats were uncomfortable and narrow, and there was no adequate light, heat or ventilation. If the weather was wet, pavements slippery or icy, these vehicles were positive menaces on the highways.

We all realized that our first duty was an immediate change in chassis design to lower the center of gravity

Digitized by Google

and to create a safer vehicle. This meant an entire change in spring arrangement. These were underslung, and auxiliary leaves were introduced to care for the variable load factor. About the same time, dual tires for the rear axle were introduced. This went a long way toward establishing safety by reducing skidding. The manufacturers started to design engines for bus use and adopted the six-cylinder motor. The lowered chassis immediately allowed an increase in length and, consequently, in seating capacity, and success with the six-cylinder engine has increased horsepower from the 40 hp. engine of 1923, to those of 150 and 180 hp. which are being used today.

In 1925 the gas-electric hook-up was first started experimentally and proved an immediate success. We are now operating approximately half of our fleet of 2,500 with gas-electric buses. We use them entirely for city service in congested areas and for low-speed work. We believe them superior in this type of service, both from the point of view of the operator, the passenger and the maintenance department. City service with us means a speed of 8 or 9 m.p.h., depending upon congestion. It means that there will be ten stops per mile.

Every operator, therefore, in the course of nine hours' work, would be compelled to make 3,600 motions with his gear shift lever, if he was driving a gear shift bus, and these 3,600 motions would only include passenger stops, and not traffic delays, slow-ups, or signals. Of these 3,600 motions, three-quarters of them are in process of acceleration. There was, therefore, a tremendous temptation always confronting the operator to start in second or third speed, abusing the clutch, jerking the passengers and damaging the equipment. Before we went to gas-electric operation approximately 80 per cent of our road failures in city service resulted from trouble back of the motor. The gas-electric drive eliminates the gear shifting and is consequently not only a great benefit to the operator, but gives the passenger a smoother and more comfortable ride and creates, we believe, a saving in maintenance. We have confined our gas-electric operation entirely to city service where a large number of stops per mile is the main factor to be considered.

As we have progressed in the improvement of the chassis, engine and driving mechanisms, we have, likewise, been able to produce a better body, and have been supplied with seats and other accessories constantly improving in comfort, rider appeal and performance. Tire development is only one example of this. In common with many other large companies, we do not buy any tires, but tire service on a mileage basis. Our first tire contract showed an average mileage per tire of approximately 8,000 miles. We now have balloon tires on practically our entire fleet, and this year our tire mileage will be approximately 25,000 miles per tire—a 300-per cent improvement in the course of six years, certainly a wonderful record. For this we have the energy, research and ability of the tire manufacturers to thank. In the same way, lighting, heating and improved ventilation have come about, as a result of infinite tests, care, patience and money. The bus we are putting on the streets today is a vehicle as safe, as comfortable, and as fast as a private automobile, and it is because of these factors that the bus has taken its present position in the transportation field.

In 1923, which was the first year of our bus operation of any magnitude, we operated 500,000 bus-miles, carried approximately 2,000,000 passengers, and ran at a speed of 8 m.p.h. Last year, 1929, we operated 82,000,000 bus-miles, carried 344,000,000 passengers, and our speed was 10.5 m.p.h.

From an operating point of view, the advantage of the bus is its complete flexibility. There is nothing to hold the bus to either a fixed position on the street or to a fixed route. In case of congestion, fire, disturbance of any kind, the bus can be rerouted either around an adjacent block or to a larger extent. Express service can be installed by taking loaded equipment off congested thoroughfares and expressing them via the fastest possible route. Curb pick-up and delivery is another important item of service to the shippers that has popularized the motor bus.

We are very firmly of the opinion that in our larger cities, where mass transportation and street congestion are important factors, the operation of electric cars on rails must still be considered as the backbone of local transportation. Buses can be used in many ways to co-ordinate with this service; to supplement it; to extend it; to tap new areas; to furnish new crosstown services; to replace single-track trolley operations and to furnish de luxe service at a higher fare. But the development of the art has not yet reached the stage when bus operation can supplant entirely the electric car. In some of our smaller cities such as Paterson, Passaic, New Brunswick, Elizabeth and Plainfield, our local service is now practically 100 per cent bus operation, but in larger localities car operation is still necessary. Altogether, we have replaced car service on approximately 150 miles of single-track, but we have not abandoned a single mile of double-track car line. In Newark, although we are operating over 500 buses, we are still running approximately 450 trolley cars, and if these 450 cars were to be removed, more than double that number of buses would be required to take their place. I doubt if the imagination can picture Broad Street with 1,000 more buses on it at 5 o'clock at night than there are today.

We are very firmly of the opinion that in our larger cities, where mass transportation and street congestion are important factors, the operation of electric cars on rails must still be considered as the backbone of local transportation. Buses can be used in many ways to co-ordinate with this service; to supplement it; to extend it; to tap new areas; to furnish new crosstown services; to replace single-track trolley operations and to furnish de luxe service at a higher fare. But the development of the art has not yet reached the stage when bus operation can supplant entirely the electric car.

A. T. Warner

Digitized by Google

RELIABILITY

Features Reading's Power Supply

By C. L. DOUB
Assistant Engineer, Reading Company
Philadelphia, Pa.

INITIAL plans for the Reading electrification authorized in 1928 included only suburban lines within a radius of about 25 miles from Philadelphia on four branches, with the view that it was the beginning of a program of more comprehensive scope. During 1930 extensions were authorized to Doylestown and to West Trenton, respectively about 35 miles and 33 miles from Reading terminal. These additional authorizations bring the total up from the original 50 miles of route and 120 miles of single track to 69 miles of route and 161 miles of single track. Five miles from Philadelphia to Wayne Junction has four tracks, the Doylestown and Hatboro branches are principally single-track, and the remainder is principally double-track. East of Neshaminy Falls is also principally four-track, and all are being electrified.

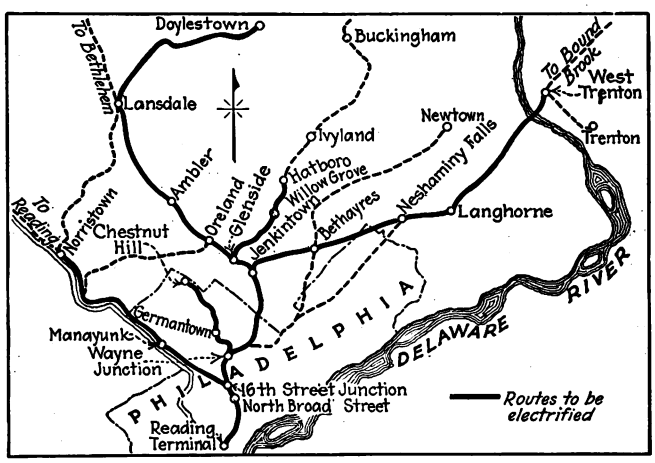
Since the ultimate plan is to electrify through passenger and freight service, designs are being made for all classes of trains in the present electrification so that the system can be extended readily at any time without material changes in the present power supply, excepting as to additions of equipment. These plans include possible electrification to New York, Bethlehem, and Reading, involving some 250 route-miles and about 1,000 track-miles including yards and sidings, which may be served with power from the Philadelphia area.

The single-phase alternating-current system, with nominally 11,000 volts on contact wires and with actual design for 12,000 volts, is being used.

The power and substation layout was based on one source of supply at Wayne Junction, about 5 miles from Reading Terminal, near the electrical center of the Philadelphia load. Adequate property was available, and the location is at an advantageous junction point for the railroad lines, and situated favorably as regards other railroad operating facilities. It is also advantageous for the Philadelphia Electric Company, from which the power will be purchased, being close to its principal Philadelphia load center. The power company is providing at Wayne Junction a 60-cycle to 25-cycle frequency changer station exclusively for the railroad load. This station will have initially two 15,000-kw. 70-per cent power factor, 21,400-kva., motor-generator sets and space for six such sets with an ultimate total installed capacity of 90,000 kw. and 128,000 kva.

The railroad substation at Wayne Junction will receive power from the power company at 13,200 volts, 25 cycles, single phase, where it will be transformed and distributed to the railroad's contact system and transmission lines.

Due to the heavy traffic density on the Reading company trackage, which is used jointly for suburban, through passenger, freight and switching purposes, the greatest flexibility of train operation must be provided. An unusually large number of interlocking plants permit the most flexible use of tracks, and it was considered necessary to provide sufficient sectionalizing of contact lines that this flexibility in use of tracks would not be impaired by the electrical system. The location of these

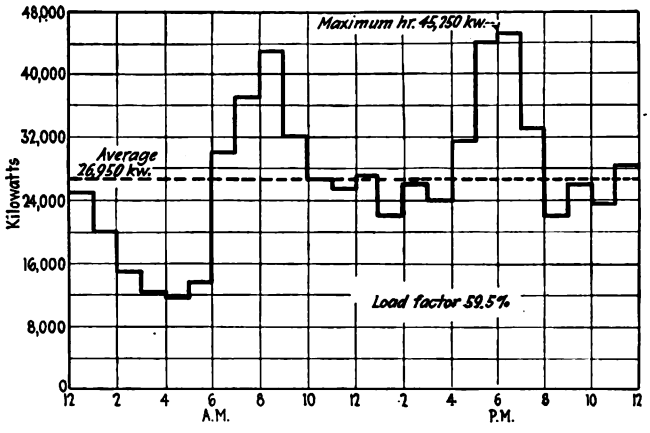


Recent authorizations have extended the Reading electrification to include 69 miles of route and 161 miles of single track

interlocking plants and junctions of the various branches made it advisable to install switching stations with complete automatic protection at intervals of approximately 6 miles, regardless of power transmission or voltage regulation requirements, and it was considered advisable to make these stations complete substations by the addition of transformer equipment. There would be further advantage of substations at comparatively close intervals in reducing the total induction from the electrical system.

For the initial railroad power installation it was decided to use the three-wire system with a superimposed high-voltage transmission line to serve future extensions into more remote territory. The voltages chosen for the three-wire system were 12,000 between trolley and rail, 24,000 between "feeder" and rail, and 36,000 between trolley and feeder. The two-wire, single-phase transmission line would be 66,000 volts. Electrification beyond the initial territory could be carried out by using additional three-wire distribution fed from one or more outlying points through suitable stepdown transformers. These transmission lines become simple lines from Wayne Junction to one outlying feed point on each branch, with a minimum of high-voltage switching equipment.

Digitized by Google



Estimated weekday loads for the electrification when extended to Bound Brook, Bethlehem and Reading will reach an hourly maximum of 45,250 kw. in winter

The arrangement permits tapping the 66-kv. lines at any desired intermediate points to augment the three-wire system through so-called "three-winding" or tapped-secondary transformers, should the growth of the electrical loads make it desirable. Space is being reserved at certain of the initial intermediate substations so that at any time they may be readily extended to become such step-down substations with small additional cost.

Substations for the initial electrification will have installed capacity as follows:

Substation	Transformers Number	Transformers Kw. Each	Substation	Transformers Number	Transformers Kw. Each
Reading Terminal	3	2,000	Bethayres	1	2,000
Wayne Junction	3	8,000	Neshaminy Falls	2	2,000
Jenkintown	2	2,000	Yardley	2	2,000
Ambler	1	2,000	Chestnut Hill	2	2,000
Lansdale	2	2,000			
Doylestown	1	2,000	Total	3	8,000
Hatboro	1	2,000	Total	17	2,000

Low-reactance auto-transformers of 2,000 kva. are used excepting at Wayne Junction, where 8,000-kva. transformers step up from 13.2 kv. (generator voltage) to trolley-rail voltage of 12,000 and trolley-feeder transmission voltage of 36,000. All transformers are nominally rated with 50 per cent overload for two hours, and 300 per cent for five minutes. Both types are oil-insulated, self-cooled.

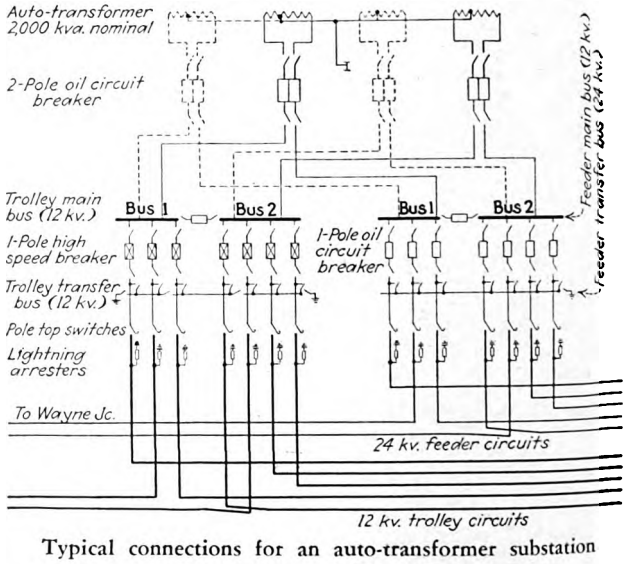
All contact lines in each direction from each substation are fed independently by high-speed circuit breakers. Duplicate feeders at 24 kv. to ground are installed along each portion of the route, excepting the single-track branches, with oil circuit breakers serving each end of each feeder. The substations are, therefore, switching stations for all feeders as well as all trolley circuits.

The typical station includes a single-conductor trolley bus and a single-conductor feeder bus, each serving the respective outgoing lines and each being fed through two-pole breakers from the auto-transformers at that station. The most important stations include automatic oil circuit breakers for sectionalizing each bus, with additional remote manual-operated disconnecting switches for further localizing trouble in these buses. The remainder of the stations have remote manual disconnecting switches only in the bus, but if desired, oil circuit breakers may be installed later for bus sectionalizing. Each bus or bus section has automatic differential protection against faults on the bus or immediate connections. This locks out all breakers connected to that section of the bus but to allow restoring service immediately if the trouble clears itself, these lock-out relays may be reset through the supervisory control system.

Further flexibility in switching of lines and maximum operation without stub-end feeds are made possible through a transfer bus for each trolley and feeder bus with remote manual-operated disconnecting switches for each outgoing line and transfer bus sectionalizing switches. These will be used for routine breaker and bus maintenance as well as in case of trouble. This bus may be used to connect any two lines together to feed from one circuit breaker, or, by use of transfer bus sectionalizing switches, may connect more than one of such pairs in certain combinations. With this grouping of the outgoing lines, de-energizing a section of the main bus will de-energize only one track or one feeder in any territory. Also when a main bus is out, all lines served by that section can be grouped through the transfer bus to be served by other breakers in the station so as not to impair the relay protective scheme. The transfer bus for the feeder is somewhat less necessary than for the contact lines since a main bus outage will not kill all transmission lines in one direction. This transfer bus will, however, permit the maximum use of the feeder transmission copper in the event of bus or circuit breaker troubles or during routine maintenance. Ground switches are being installed upon the transfer buses so that they may be used also as ground buses under certain special conditions.

Outgoing lines are all provided with horn-gap disconnecting switches on the substation terminal structure so any connections within the substation limits may be de-energized for working purposes. Lightning arresters are being installed upon the terminal structure, connected at the line side of the switch through "live line clamps" to permit them to be disconnected readily. Remote manual group-operated disconnecting switches isolate each circuit breaker.

High-speed circuit breakers feed all trolley circuits. Both oil and air-type circuit breakers have been developed for 12,000 volts within the last several years and have been thoroughly tried out in heavy-duty service. The circuit breaker chosen was the General Electric JRA-32 air-break high-speed type with a rating of 1,500 amp. continuously at 15,000 volts, 25 cycles. This breaker has a single-pole interrupting capacity of 50,000 amp. at 12,000 volts, and is specified to perform 50 "OCO" duty cycles consecutively at two-minute intervals as compared to the usual rating of only two "OCO" duty cycles which

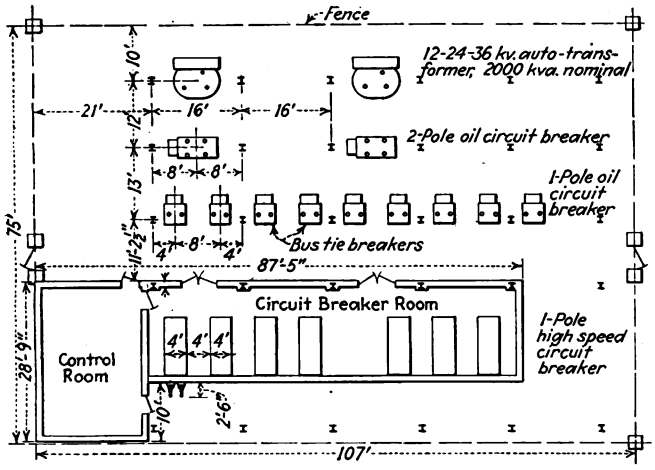


Typical connections for an auto-transformer substation

Digitized by Google

is standard for the normal oil circuit breaker. Its principle is the so-called "impulse tripping" on short circuits depending on the rate of change of 25-cycle current from one half cycle to the next. It is a development of the indoor type of breaker, although it can be arranged for outdoor mounting by the addition of suitable weather-proofing covers.

The control and breaker building is laid out parallel to the main tracks and at one edge of the substation. An adjacent parallel bay of the outdoor substation provides for the single-pole feeder breakers serving the outgoing 24-kv. lines and also single-pole breakers of the



The auto-transformer substations include outdoor high-tension equipment with indoor circuit breakers

same type which are used as bus tie breakers. The next parallel bay provides for the two-pole transformer breakers connecting transformers to trolley and feeder buses, beyond which is the transformer bay along the opposite side of the auto-transformer station. Single-pole feeder breakers and two-pole transformer breakers are all outdoor oil breakers of the newly developed Westinghouse "deion grid" type. Outgoing lines may be taken out at either side of such a substation and the substation located most advantageously for the use of a siding or of main line tracks along one side from which to handle the transformers.

In order to simplify design and maintenance, a unit type of construction was adopted for auto-transformer stations so that all stations will be similar except for the number of units required for the varying numbers of transformers and outgoing lines. The typical unit consists of a 16-ft. section containing two trolley breakers, two feeder breakers, one transformer breaker, and one transformer. A particular station includes the necessary number of units with such items of equipment in each unit as are required. Trolley and feeder breakers are each located on 8-ft. centers and are so connected that the corresponding outgoing lines are staggered and are run parallel and horizontal, with 4-ft. spacing, to a feeder structure over the tracks opposite the substation location. Connections to lines at the feeder structure are made by taking vertical leads upward to 24-kv. feeder lines and downward to the catenary system.

The resultant layout is compact, simple and clear. The space requirements and over-all height are moderate, but electrical and working clearances around apparatus and connections are liberal.

The portion of the main station supplying trolley and feeder lines at Wayne Junction follows the same unit design as for auto-transformer stations, with exactly the same arrangements and spacing of apparatus. There is added, however, a section of station for primary power supply to the transformers, which is not necessary for auto-transformer stations. This extension includes a bay for primary 13.2-kv. double-pole circuit breakers adjacent to the transformer bay, beyond which are two bays for the 25-cycle, 13,200-volt ring bus with generator and bus sectionalizing breakers, future bus tie reactors, etc.

The ring bus is single phase. Space is reserved for a third conductor to be added to change to a three-phase bus should parallel operation of frequency changer units in the future make this desirable in order to hold these machines in synchronism. The bus is designed for an ultimate of six sections of ring, each to be served by one 15,000-kw. frequency changer set and each section to feed two 8,000-kva. transformers, one with three windings for the three-wire distribution system and the other to step up to serve the 66-kv. transmission lines. Complete automatic protection would be provided for each bus section and additional short circuit limiting reactors would be installed at several points in the bus for connection when all machines were operating. The initial portion of the station will include only a portion of the ring bus, so arranged so as to provide three sections in straight line, each feeding one 8,000-kva. transformer, and the end sections being fed by the two frequency-changer units installed initially.

The initial Wayne Junction station serves ten outgoing contact lines and six outgoing feeder lines. As additional tracks are electrified, it is planned to extend the three-wire portion of the station to serve twenty outgoing 12-kv. trolley lines and eighteen outgoing 24-kv. feeder lines, and to make a further extension of the station to provide a 66-kv. section containing a possible ultimate of seven 8,000-kva. step-up transformers, bus, and eight double-pole 66-kv. breakers for duplicate outgoing lines toward Bethlehem, New York, Reading, and the transmission system of the Baltimore & Ohio Railroad, all as and if required. The 66-kv. transmission lines toward New York can be extended to connect with the system of the Central Railroad of New Jersey, over which the Reading Company has trackage rights between Bound Brook and Jersey City, its New York terminus.

The Wayne Junction substation building includes a two-story control house, the second floor of which will be load dispatching headquarters for the entire electrical system. A supervisory control system is provided for the operation of all of the present substations, none of which will be attended, and the load dispatcher will directly control all circuit breakers, motor operated disconnecting switches, etc., from an operating desk. The layout is made for future extensions to cover all of the through passenger and freight territory above referred to, if it is desired to perform this operation from the Philadelphia headquarters. The railroad load dispatcher will be in close telephone communication with the railroad train dispatchers and also with the load dispatchers and operators of the Philadelphia Electric Company system supplying the Reading company.

The control buildings for all substations will include switchboards for control and protection of all lines, storage batteries and charging equipment, and supervisory control equipment operated directly from the Wayne Junction load dispatcher's headquarters, together with the maintenance and inspection facilities required.

Digitized by Google

More Power

By

J. W. WELSH

Assistant to the President, Cleveland Railway

Motors of radically higher horse-power are needed. Efforts to reduce energy consumption may be false economy. Possible savings in transportation expense resulting from higher speeds are greater than the added power cost

AUTOMOTIVE engineers have not been afraid to use power freely, even extravagantly, to secure pre-eminent performance, while electric railway engineers have bent every effort to use as little power as possible. As a result, the automobile has outstripped the electric car in acceleration, maximum speed, and in the general flexibility of its operation. American automobiles compared with foreign types have admittedly employed larger engines and faster gear ratios, partly because gas is cheaper and taxes are lower here, but more than anything else, because the *sine qua non* of motordom today is power. A speed margin of 5 per cent has satisfied electric railway engineers in applying motors to cars, while the automobilist has had held before him the thrilling possibilities of a speed margin of many hundreds per cent. What the electric car needs is more torque, continuously, uniformly and copiously available from rest up to the maximum operating speed.

Our researches in the direction of increasing speeds should take nothing for granted. The characteristics of the series motor, admirable as they are, have some notable deficiencies. It is true that, during the first part of the acceleration period, while running on resistance up to the point of applying full voltage to the motors, the series motor is an effective torque machine. During this period, the acceleration may be made as rapid and smooth as conditions will permit. But as soon as the resistance is cut out, the car speed crawls lazily up along the gradual slope of the motor curve at a most aggravatingly leisurely pace.

We talk about gearing our cars in city service for free running speeds of 30 m.p.h. or more, and yet, in frequent stop service, it is rarely possible to attain over half these speeds. Even if we do, we have employed a time wasting process during the latter part of the accelerating period. Thus, in a typical case with an initial accelerating rate of 2.5 m.p.h.p.s., 12.5 m.p.h. is attained in five seconds; but it takes 100 seconds to attain the free running speed of 28 m.p.h. This is illustrated in the typical performance curve shown in an accompanying chart.

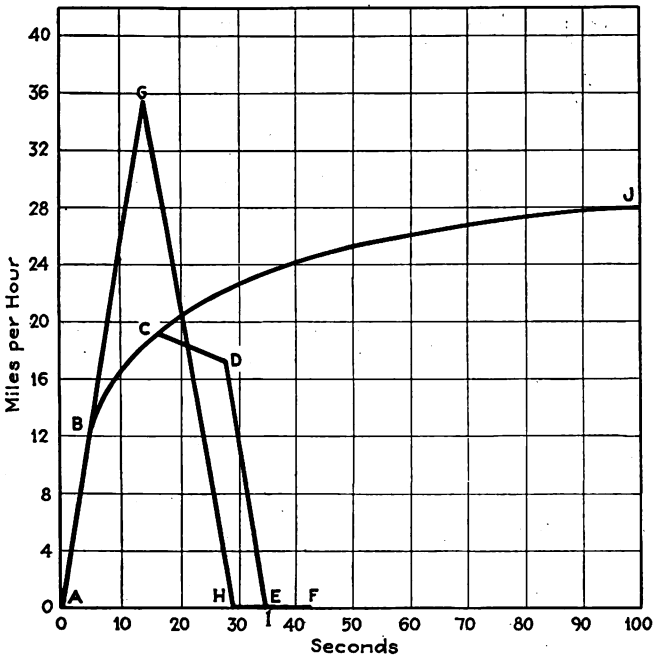
The reason for this sluggishness in acceleration after the resistance notches are passed is that the torque is being gradually reduced as a result of the weakening of the field. This follows the reduction in current due to increasing counter electromotive force as the speed increases. Further, the free running speed may be increased by weakening the field by the reduction of current in the field windings, by shunting the current around them, or by cutting out a part of the turns. In any case, a higher speed, it is true, is secured, but at a relatively low rate of acceleration. And the reason is that acceleration is proportional to the torque, and the torque is low because of the weakened field.

With the present characteristic in the design of series motors and present methods of application to service, undoubtedly an advantage accrues in many cases by using field control to attain higher free running speeds, and there is no question about its being an electrically efficient method. The objection is the slow rate of acceleration and loss of time that accompanies its use.

In frequent-stop city service the time cycle is, at best, all too short. In the past it may have been satisfactory to handle a service calling for, say, seven stops per mile, with a cycle of 42 seconds, approximately five seconds on resistance points, eleven seconds creeping up on the motor curve, twelve seconds coasting, seven seconds braking, and seven seconds standing. Such a cycle is shown at *ABCDEF* in the diagram. Elimination of the coasting will cut the duration of the run only slightly.

If maximum acceleration can be continued until the current is cut off at a considerably higher maximum speed and the brakes are applied immediately, as at *AGHI* a far higher schedule speed is possible. Obviously, such a cycle demands a material increase in motor horsepower and in energy input.

Digitized by Google



Speed-time curves for normal and suggested operation

Service: 7 stops per mile — 2.5 m.p.h.p.s., braking
7 seconds per stop — 2.5 m.p.h.p.s., acceleration

Beginning with the typical cycle *ABCDEF,* the run of $\frac{1}{7}$ mile would be made in 42 seconds. In the fast run, *AGHI,* the same initial acceleration, 2.5 m.p.h.p.s., would be continued up to point *G* at 35.5 m.p.h. Then power would be cut off and the car stopped by the brakes at the same retardation rate of 2.5 m.p.h.p.s., at the end of 28.5 seconds, reducing the total time for the run, including the seven-second stop, to 35.5 seconds. The schedule speed would be 14.5 m.p.h. against 12.2 m.p.h., a gain of 19 per cent. This material gain in schedule speed would involve changes in energy consumption as shown in the following table:

	Ordinary Equipment		High-speed Equipment	
Maximum speed, m.p.h.	19.4		35.5	
Speed at cut-off, m.p.h.	12.5		35.5	
Maximum power per motor, kw.	46.2		131	
	Ft.-Lb.	Per Cent of Total	Ft.-Lb.	Per Cent of Total
Maximum kinetic energy per ton; foot-pounds ($\frac{1}{2}MV^2$)	25,500	56.4	85,000	51.4
Rotational energy, 5 per cent	1,275	2.8	4,250	2.6
Car resistance	7,540	16.6	11,310	6.8
Rheostatic loss	6,000	13.2	48,000	29.0
Motor and gear loss	5,000	11.0	16,900	10.2
Total	45,315	100.0	165,460	100.0

The first two items, which are more than 50 per cent of the input, represent useful utilization of power in the sense of attaining the objective of transportation service, i.e., speed. The remaining three elements represent losses whose reduction is, of course, desirable.

Comparing the two runs the kinetic energy, increasing as the square of the speed, is more than three times as great for the fast one. The accelerating current is correspondingly greater and the time running on resistance is almost three times as long. The rheostatic losses are eight times as great. This suggests the desirability of an improved control to reduce rheostatic losses, although this is important only in frequent-stop service, as illustrated by this rather extreme example. In general, energy consumption at double the speed is more than four times as great, all other conditions as to stops, rate of acceleration, etc., remaining the same.

Even to suggest such a thing as quadrupling the energy consumption would seem to most engineers almost preposterous, even though it resulted in doubling the speed. It would seem that so great a difference could hardly be justified in balancing the increased cost of energy against the reduced cost of transportation, yet this is not impossible. Here are actual cost comparisons:

	Cents
Present cost of energy per car-mile	3.5
Proposed cost of energy per car-mile (four times)	14.0
Increase	10.5
Cost of trainmen's wages per car-mile	16.0
Fixed charges on cars, shops and stations per car-mile	5.0
Present total car cost per car-mile	21.0
Proposed car cost per car-mile ($\frac{1}{2}$)	10.5
Decrease	10.

Here the increased cost of energy just balances the decreased transportation cost. Moreover, this takes no account of the certain increase in revenue, which any recognizable increase in speed has on the car riding habit. This example is given merely to show how far a company may go in increasing its power to secure speed.

But quadrupling the power on electric cars has other justifications. Some 1930 automobile models advertise a rating of 125 hp. for five-passenger vehicles, or 25 hp. per passenger. Present-day street cars may go as high as 200 hp. for 50 seated passengers, or at the rate of 4 hp. per passenger. On this basis we might increase motor capacities six times instead of four.

Obviously, a company is not likely to quadruple its power cost for increased car speeds until it has exhausted other means. First, waste time in schedules should be searched for and cut out, along with a study for stop reduction and more rapid acceleration, all of which increase schedule speed with little or no increase in power. Next, car weight should be reduced. In many new cars it is being cut in two. The fallacy that heavy equipment is essential for comfort and safety at high speeds is being exposed. Low-floor cars, small wheels, and high-speed motors all contribute to this end.

Probably the reason for the reluctance to use more power is that its cost, like every other item of expense, has been subject to rigid scrutiny and every effort made to reduce it. Power-saving campaigns have been the order of the day on most properties. The error in this procedure is the tendency to reduce the use of power at any cost. The energy consumed, as we have seen in the above analysis, may be divided into two parts, one a useful part devoted to bringing the car up to speed and the other a wasted part devoted to overcoming the various losses. Failure to differentiate between the useful and wasteful elements in energy consumption has been the cause of much loss to the industry. In a word, the industry has falsely economized on power, and thus sacrificed the most vital essence of transportation, i.e., speed.

Nobody questions the desirability of reducing power waste; but we have seriously handicapped ourselves in meeting our principal competitor, by failing to use freely and effectively our most distinctive ally, electric power. On the Cleveland Railway, we have felt for a long time that a larger use of power is justified and the experimental work which we have already conducted indicates the economic desirability of a still greater utilization in the future.

Digitized by Google

Pittsburgh Traffic Signal Controlled by Street Car Movement

DELAYS to street car operation have been reduced as a result of the installation of traffic signal apparatus at Ellsworth and Negley Avenues, Pittsburgh, to prolong the green indication when a car is approaching the intersection. A somewhat similar installation at Louisville, Ky., was described in ELECTRIC RAILWAY JOURNAL, September, 1929, page 835.

The traffic signal at Ellsworth and Negley Avenues has a cycle known as the "non-overlapped four-way amber" which displays a single indication to each street at any instant. The green indication on Ellsworth Avenue and the red on Negley Avenue are adjusted to be displayed

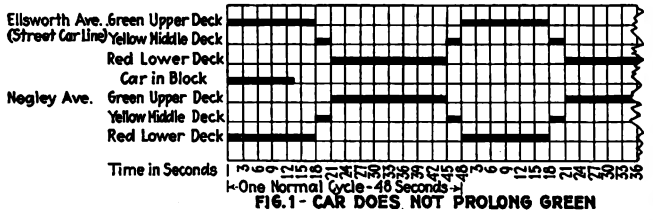


FIG. 1 - CAR DOES NOT PROLONG GREEN

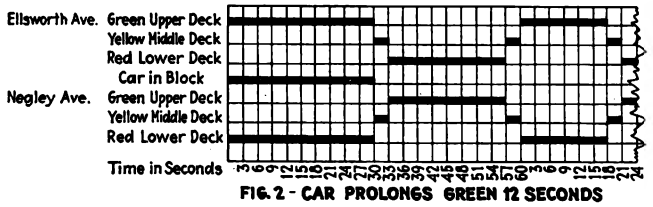


FIG. 2 - CAR PROLONGS GREEN 12 SECONDS

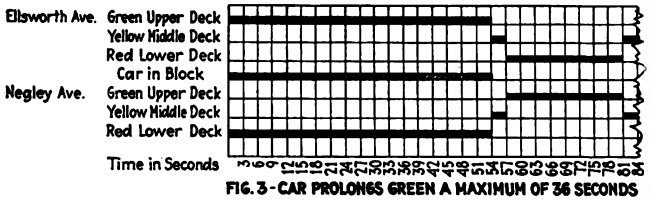


FIG. 3 - CAR PROLONGS GREEN A MAXIMUM OF 36 SECONDS

simultaneously for eighteen seconds, after which both indications change to amber, which is displayed to both streets for three seconds. At the end of this period the amber is extinguished and red is shown on Ellsworth and green on Negley for 24 seconds. Then amber is shown to both streets for three seconds. This cycle is repeated continuously by the motor-driven timer.

On each of the double tracks on Ellsworth Avenue there are two overhead trolley contactors, one set back 300 ft. before the car reaches Negley Avenue and the other placed at Negley Avenue. These contactors are actuated by the passing trolley wheel to form an electrical circuit. If a car passes the first or setting contactor to enter the control block with the signal showing green on Ellsworth, and passes the clearing contactor at Negley Avenue sooner than eighteen seconds from the beginning of the green display, the traffic signal indications are not disturbed by the movement of the car. If, however, the car passes the first contactor during the green display and does not pass the crossing until later than eighteen seconds, the green is prolonged until the clearing contactor is actuated. Then the amber and the red follow in the normal cycle.

It is evident, however, that the car should be able to prolong the green only up to some predetermined limit, and if it does not pass the crossing within that time, then the signal will go to amber and red automatically. In this installation the time-element relay has been set for a green maximum of 54 seconds, being a prolongation of 36 seconds.

Since the cycles will be of variable length as determined by car movements, it is evident that this signal is not adapted to a wave or progressive system involving a number of crossings, but is suitable only for an isolated crossing where there is a main street with heavy traffic and a cross street with much lighter traffic.

It is an advantage with this arrangement to make the green periods for the two streets more nearly equal than would be otherwise possible, and to prolong the green period for the heavily traveled street when the trolley cars with their heavy traffic behind them require it. It will be noted that in no event is the display of the red shortened to the approaching car. The distance the contactor is set back for the crossing is that through which the car moves during the display of the red.

The apparatus for this control was furnished by the Nachod & United States Signal Company. It involves a motor-driven timer, a relay box with contactor-operated relays and a time-element relay together wth four overhead trolley contactors located as described, all of which operate on the ordinary three-decked, four-way traffic signal.

St. Louis Tags Transfer Passengers

DEPARTING in a number of ways from ordinary practice, a new type of transfer has been perfected and put into use by the St. Louis Public Service Company. Adoption of the new transfer system is the result of months of exhaustive investigation and experimentation.

Two transfer forms are used on each route, one for each direction of travel. Both forms have "P.M." coupons on the free end and locality tear-offs at the padded end. On each form the tear-offs are arranged successively in the order in which the localities are traversed, with the starting point tear-off nearest the transfer body. Such arrangement prevents alteration of a transfer after issuance because a shortened transfer allows fewer privileges than one with more tear-off sections attached. The last tear-off on all transfers is marked "Emergency" for issuance when cars are off route, turned back, or in any irregular situation. The transfer is $5\frac{3}{4}$ in. long by 2 in. wide. Printing economies of over $1,500 a month are being realized because of the smallness and simplicity of the transfer.

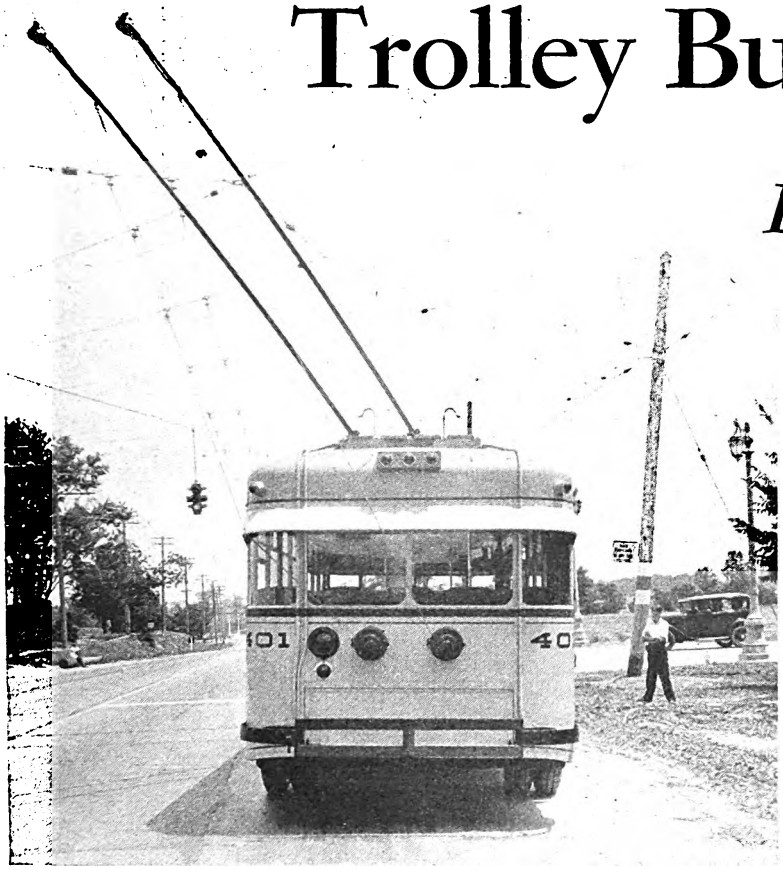
When a passenger tenders a transfer for fare and desires to ride on another line, the trainman sets a punch mark in the square denoting the direction of his car, and returns the original transfer. This scheme does two things; it keeps the original transfer with the passenger until the end of the journey, thereby indicating to each trainman the origin and general direction or history of the ride, and it places the transfer in each intermediate trainman's hands for inspection.

Digitized by Google

Trolley Bus Operation

Proves Advantageous at Detroit

High speed, curb loading, comfortable vehicles and quiet operation are factors in building up patronage



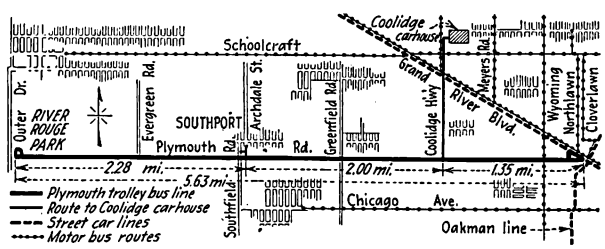
Trolley bus on the Plymouth Road line, Detroit. Note the overhead details, the trolley shoes and the wide smooth highway

DECREASED operating costs, increased traffic, improved public relations, and almost entire freedom from accidents are advantages of trolley bus operation on Plymouth Road, Detroit. Both the patrons and the management of the Department of Street Railways are pleased with this new type of service.

Compared with the buses which were formerly used on the line, reductions have been made from 4.80 to 2.02 cents per vehicle-mile for power, from 1.90 to 1.75 cents per vehicle-mile for tires, from 13.04 to 9.25 cents per vehicle-mile for maintenance of equipment, and in total operating cost from 29.21 to 21.95 cents per vehicle-mile.

It is expected that the trolley bus will be subject to comparatively few accidents. In the first four months, nine minor accidents occurred, but seven of these occurred during the first two months when the operators were still unaccustomed to the new type of vehicle.

The route, which is 5.63 miles in length, extends along Plymouth Road from Grand River Boulevard to River Rouge Park. It is located in the northwest section of the city and serves a rapidly growing residential district. Between Grand River and Southfield, a distance of 3.35 miles, the district is well built up. From Southfield to the end of the line, however, there are few houses. For this reason some of the vehicles are turned back at Southfield, to give more frequent service over this section of the line. Most of the traffic on the outer end is to and from River Rouge Park, which has a golf course, swimming pools, tennis courts, and other facilities for recreation. At the park end the buses turn around on a specially constructed loop. At the Grand River end they loop around a triangle which lies between Plymouth and Grand River. Connections are made at this point with the Grand River street car and parlor bus lines, the Oakman car line and the Schoolcraft bus line. At Wyoming Street the route crosses a bus line which gives rush-hour service. One large industrial plant, employing approximately 2,000 men, is located along the route.



The Plymouth Road trolley bus line in Detroit extends from Grand River Boulevard to River Rouge Park, a distance of 5.63 miles

In rush hours six-minute service is given on the line. During base hours fifteen-minute headways are maintained to Southfield and 30-minute headways to River Rouge Park.

A cash fare of 10 cents, with free transfers to street car lines, is charged. This is the same as for all bus lines.

Plymouth Road is particularly suitable for trolley bus operation, since it is a smoothly paved wide highway. Because of the condition of the street it is possible to operate at high speed. In June, the trolley buses were operated at a scheduled speed, including layovers, of 12.90 m.p.h. In July this was increased to 13.37, and in August to 14.33. Corresponding speeds for these three months in 1929 when a gasoline bus was being operated were 10.76, 10.26 and 10.46. Operating speed without layovers for the trolley bus in miles per hour is 15.33. This is 1.39 m.p.h. faster than the bus speed.

Digitized by Google

It is possible to detour around three lanes of traffic with the trolley buses. This maneuverability permits a high rate of speed

Six Twin Coaches were purchased for the original installation. They are of the 40-passenger type, with leather upholstered seats, treadle exit door and foot control. An interesting device on the vehicle is a switch on the trolley base for lighting a lamp near the operator when the vehicle swings too far from the center line of the overhead. Another noteworthy feature is the use of a reversible trolley shoe. This permits better collection of current at all speeds and practically eliminates overhead noise. Because the vehicle itself is inherently quiet, the use of trolley shoes is considered to be particularly advantageous.

At the present time the six vehicles are being stored and maintained at the Coolidge carhouse. The vehicles are stored in the open, but all inspection and repair work is carried on inside the shop. Plans are now being made for a new garage to care for the vehicles. When it has been built they will be maintained exclusively in this structure. The Coolidge carhouse is approximately 1.2 miles north of Plymouth Road and is reached by overhead allowing two-way operation.

To obtain the best information pertaining to the efficiency of the equipment, as well as schedules, and to note operating conditions in general, it was decided to discard the customary supervisor's and driver's reports because of their inherent insufficiency and to adopt some mechanical means of supervision, not requiring charts which entail a clerical force and clutter up files. After investigating the available instruments, a device known as the Telcam was adopted. A trial installation was made on a coach and later when the trolley buses were ordered, the specifications called for them as regular equipment. No charts are used, the cumulative totals being registered in roller counters, which are noted with each change of driver on a special report form.

The instrument gives the following readings at a glance:

Total Mileage—This counter is at the bottom of the dial and saved the cost of an odometer.

Total Running Time—At the top and extreme right of the instrument's face a counter registers the time in hours and tenths that the bus is actually moving, including all stops up to fifteen seconds' duration. This information will aid in reducing non-revenue time.

Total Overspeeding Time—This register shows how many minutes the bus is run above the speed limit, which for this line has been set for 25 m.p.h.

Number Times Overspeeded—This counter records the number of times the bus was run above the set speed limit. This is called the "abuse factor."

Maximum Speed—A secondary hand on the dial (painted red) is a maximum speed indicator, and is carried forward by the speed pointer, remaining at the maximum speed until reset with a key held at the garage.

A recapitulation is made of information obtained from the daily reports showing the performance records of each bus for the month. A report also is made of each operator's performance. A glance at these gives an accurate check of practically every factor pertaining to the efficiency of the operators and vehicles, as well as the schedules.

Overhead is provided for two-way operation along the full length of the route. Each pair of wires is located so that the vehicles running directly under them will clear a parked lane of cars safely. This permits easy access to the curb and a swinging out to clear a parked lane of cars and two moving lanes. The overhead, which is of the most modern type, was constructed in record time.

Riders Approve New Service

To learn the opinion of the public regarding the trolley bus the department distributed cards among the riders which stated: "We desire to know how we can better serve Detroit with transportation. The trolley bus is our idea of the latest and most superior service. Will you help by expressing your opinion?" Of 170 cards filled in, 167 were favorable to the trolley bus. In addition to many enthusiastic replies, certain of them requested extensions to the existing line, and the installation of new routes in other sections of the city. Among the many reasons given for their preference were: safety in boarding, absence of exhaust fumes, comfortable riding, quietness, convenience of curb loading, cleaner, faster, no gear noise, no dust, dependable, safer, more seating capacity, better ventilation, more flexible, roomy, ability to maintain schedules, restful, free from vibration, faster acceleration and stopping, no jerking, less interference with traffic and nice appearing.

Service was started on Plymouth Road on Saturday afternoon, June 14. The first of the six vehicles carried city officials, headed by Mayor Bowles of Detroit and Mayor Ford of Dearborn. Residents of the neighborhood were invited to ride on the other five buses and to take part in the ceremony. On the way to the park from the Grand River terminal a stop was made in front of the plant of the Kelvinator Corporation, where the employees to be served by the line greeted the officials. They were addressed by Mayor Bowles. At the end of the line several hundred persons gathered for the inaugural program.

Digitized by Google

Heating Passenger Trains on Electrified Steam Railroads

Practice of American and European roads summarized by N.E.L.A. committee. Both steam and electric heat are used extensively

METHODS of heating trains on electrified sections of railroads in Europe have been investigated by a sub-commitee of the committee on electrification of steam railroads of the National Electric Light Association. Some time ago, members of this committee spent about two months visiting the electrified railroads in England, Holland, Sweden, Germany, Switzerland, Italy and France. It was found that practice differs to some extent in the various countries and with the systems of electrification employed.

Briefly, the several means of heating which have been tried in those countries using single-phase alternating current on the contact lines are:

1. Fuel-fired steam boiler either in the locomotive, a baggage car, or a special heater car.
2. Electrode type of electric steam boiler carried in the locomotive or a baggage car.
3. Resistance type electric steam boiler in the locomotive or the baggage car.
4. Direct heat from transformer on locomotive.

Railroads using low-voltage direct current employ electric heat directly on the motor car trains, but usually heat with steam from coal-fired boilers on main line trains. Where these roads use electric heating, it is customary to have a train line of the same voltage as the contact line. The conclusion of the committee is that on a.c. roads, the present tendencies seem to favor a heating tender and direct heating from the main transformer of the locomotive.

Where electric heating is used on the single-phase roads, present practice indicates the adoption of 800 and 1,000 volts as the standard supply, this voltage being obtained by a special tap on the transformer in the locomotive. Many of the cars used on the main line

Heating Systems Used by Electric Railways in Europe and the United States

Railroad System	Electrical System—Current	Ph.	Contact Line Volts	Type of Power	Type of Heat	Steam Systems Boiler Type	Boiler Location	Electric Systems Heaters Volts	No. Per Car	Bus Line	Source
England—Suburban lines	D.C.	...	600-1,200	M.U.	Elec.	.....	.....	600-1,200	.....	....	Line
Holland—State railways	A.C.	1	16,000	Loco.	Elec.	.....	.....	600, 800, 1,000	.....	Yes	Main transformer
Germany—Suburban lines	D.C.	...	850	M.U.	Elec.	.....	.....	800	.....	....	Line
Germany—Bavarian and Silesian lines	A.C.	1	16,000	.....	Elec.	.....	.....	800-1,000	.....	Yes	Main transformer
	.....	...	.....	Loco.	Steam	Coal	Heating Tender	.....	.....	....	.....
Sweden	A.C.	1	16,000	Loco.	.....	.....	.....	800-1,000	.....	Yes	Main transformer
Switzerland	A.C.	1	16,000	Loco.	Elec.	.....	.....	800-1,000	.....	Yes	Main transformer
Italy—											
State railways	A.C.	3	3,600	Loco.	Steam	Coal	Tender	.....	.....	....	.....
Nord Milano	D.C.	...	3,000	Loco.	Steam	Oil	Loco.	.....	.....	....	.....
				M.U.	.....	.....	.....	3,000	.....	Yes	Line
France	D.C.	...	650-1,500	M.U.	Elec.	.....	.....	.....	.....	....	Line
				Loco.	Steam	.....	Tender	.....	.....	....	.....
United States—											
Baltimore & Ohio	D.C.	...	650	Loco.	Steam	.....	.....	.....	.....	....	Steam loco. held in train
Staten Island Rapid Transit	D.C.	...	600	M.U.	Elec.	.....	.....	600	Under each seat	....	Line
Butte, Anaconda & Pacific	D.C.	...	2,400	Loco.	Hot air	.....	.....	.....	.....	....	Heat from elec. grids on loco.
New York Central	D.C.	...	600	M.U.	Elec.	.....	.....	600	Under each seat	....	Line
				Loco.	Steam	Oil	Loco.	.....	.....	....	.....
Great Northern	A.C.	1	11,000	Loco.	Steam	Oil	Tender	.....	.....	....	.....
Boston & Maine	A.C.	1	11,000	Loco.	Steam	.....	.....	.....	.....	....	Steam loco. held in train
N. Y., New Haven & Hartford	A.C.	1	11,000	M.U.	Elec.	.....	.....	.....	Under each seat	....	Line
				Loco.	Steam	Oil	Loco.	.....	.....	....	.....
Michigan Central	D.C.	...	600	Loco.	None	.....	.....	.....	.....	....	Not heated in electric zone
Chi., Milwaukee, St. Paul & Pacific	D.C.	...	3,000	Loco.	Steam	Oil	Loco.	.....	.....	....	.....
Pennsylvania	A.C.	1	11,000	M.U.	Elec.	.....	.....	.....	Under each seat	....	Line
	D.C.	...	600	Loco.	None	.....	.....	.....	.....	....	Not heated in electric zone
Norfolk & Western	A.C.	1	11,000	Loco.	Steam	.....	.....	.....	.....	....	Steam loco. held in train
Virginian	A.C.	1	11,000	Loco.	Steam	.....	.....	.....	.....	....	Passenger trains steam oper.
Illinois Central	D.C.	...	1,500	M.U.	Elec.	.....	.....	.....	Under each seat	....	Line
Canadian National (St. Clair tunnel)	A.C.	1	.....	Loco.	None	.....	.....	.....	.....	....	Not heated in electric zone
Delaware, Lackawanna & Western	D.C.	...	3,000	M.U.	Elec.	.....	.....	.....	Under each seat	Yes	Line
Cleveland Union Terminals	D.C.	...	3,000	Loco.	Steam	Oil	Loco.	.....	.....	....	.....
Boston, Revere Beach & Lynn	D.C.	...	600	M.U.	Elec.	.....	.....	.....	Under each seat	....	Line
Reading	A.C.	1	11,000	M.U.	Elec.	.....	.....	.....	Under each seat	....	Line

Digitized by Google

railroads are equipped for both electric and steam heating.

On European d.c. roads, heating of multiple unit cars is usually at the trolley or third-rail voltage; 600, 1,200 or 1,500 volts. Heating units taking 3,000 volts are in use on the Nord Milano road in Italy.

As to capacity in general, 40 kw. per passenger coach is allowed for heating, or a total of 400 kw. per locomotive. No reference is made by the committee to thermostatic control, and it is assumed that practically all of the equipment inspected was arranged for hand control either by the engineer, trainmen or passengers.

Following is a condensed statement of the practice reported for the several European countries visited:

England—Electric operation is confined to suburban service around a few of the large cities. Heating is done at the contact line voltage, either 600 or 1,200.

Holland—The state railways use 16,000-volt single-phase current. Both locomotives and coaches are heated from individual heating units receiving power from taps on the main locomotive transformer. Voltages for heating are nominally 600, 800 and 1,000. This permits interchange with the cars of the German State Railways, which use 800 and 1,000 volts. A heating bus line runs throughout the train carrying the positive wire and the heaters are grounded.

Germany—The suburban lines around Berlin, which are now being changed to electric traction, use multiple-unit cars supplied from a third rail at 850 volts d.c. The power is used directly for heating the motor cars. On the branch lines in Bavaria and Silesia, the cars are supplied from the 16,000-volt a.c. trolley through special taps on the transformers. On the lines with electric locomotives, in several instances, heating tenders with coal-fire boilers are used. A regular program is under way for installing electric heaters on passenger cars to eliminate the necessity for this auxiliary. On trains supplied with electric heat from the main transformer of the locomotive, a heating bus line with standard jumpers runs the length of the train. In each compartment control switches are installed which may be manipulated by passengers or trainmen. Heating voltages are nominally 800 and 1,000.

Sweden—Locomotive-hauled trains are used on the principal lines that have been electrified. The plan for heating is similar to that mentioned for Germany.

Switzerland—The system used is practically the same as that described for Germany and Sweden. In fact, much of the development work which was done before the adoption of the present practice in those countries was done in Switzerland. It is interesting to note that passenger coaches which are normally hauled by electric locomotives, and which cannot receive heat from them while standing alone in stations, are heated by means of special transformers mounted on portable trucks which can be moved around the station on the running rails. On the Loetschberg line, an experiment was made with steam boilers heated by electricity. When it was learned that the amount of energy required was three times as great as that for direct electric heating, the method was discontinued.

Italy—A majority of the electric trains in Italy are heated by coal-fired boilers carried on separate tenders. An oil-fired boiler is being tried out on one of the three-phase passenger locomotives. On account of the comparatively small requirements for car heating the problem does not apparently receive the attention which it is given in the more northerly countries. On the privately owned Nord Milano line, which has 3,000-volt d.c. multiple-unit cars, a bus line is carried across the car roof, and heating elements using 3,000 volts are arranged in two parallel groups so that the amount of heat can be controlled by the trainmen.

France—Multiple-unit trains in the vicinity of Paris operating from both 650 and 1,500 volts are electrically heated, using power at contact line voltage. On main-line trains hauled by electric locomotives it is customary to use heating tenders.

United States—For comparison with domestic practice, the accompanying table has been compiled from information supplied by the General Electric Company, giving briefly practice of the various railroads in the United States. On only one road where coaches are handled by electric locomotives are they heated electrically. This is on the Butte, Anaconda & Pacific Railway, which uses 2,400-volt hot-air heaters. The roads having multiple-unit motor cars use electric heat, the supply to the heaters being governed by thermostats on each car to maintain uniform temperatures. In the New York Terminal zone of the Pennsylvania Railroad, on the Michigan Central and the Canadian National (St. Clair Tunnel) electrification, no provision is made for heating cars within the electric zone, since the runs are comparatively short and the cars are heated by steam connections at the terminals. On motor cars on the alternating-current lines of the Pennsylvania, heating is from low-voltage taps on the transformer of each car, giving approximately 600 volts. The circuits are hand controlled at the discretion of the trainmen.

Richey Fare Index Revised

COMPILATION of average fares, which is made monthly by Prof. Albert S. Richey and regularly published in ELECTRIC RAILWAY JOURNAL, has just been revised on the basis of the population of the various cities as shown in the 1930 U. S. Census. These average fare figures are based on the cash and ticket fares in effect in all United States cities of more than 50,000 population (except New York City) and are weighted in accordance with the population of the various cities. As previously computed, the total number of cities included was 145; the 1930 census adds 46 cities in the 50,000 class and drops two, so that there are now 189 cities included in computing the average. A study of fares in connection with the revision showed that 102 cities out of the total of 189 (comprising 53 per cent of the total population considered) have average fares of less than 8 cents, and that such cities have shown an increase in population of about 43 per cent since 1920. On the other hand, the 87 cities which have average fares of 8 cents or more include a population of only 47 per cent of the total, and have increased in population only 21 per cent since 1920. The more rapid growth and the larger total population of cities with fares averaging less than 8 cents explains the reduction in the weighted average fare figure from 8.01 cents, as calculated on the 1920 population basis for October, 1930, to 7.79 cents, which is the revised average as calculated on the basis of 1930 population.

Revision of Richey Fare Index to 1930 Population

	1926	1927	1928	1929	1930
January	7.32	7.38	7.50	7.58	7.67
February	7.35	7.40	7.50	7.61	7.69
March	7.35	7.39	7.52	7.61	7.69
April	7.35	7.39	7.52	7.61	7.71
May	7.35	7.39	7.52	7.61	7.76
June	7.36	7.39	7.52	7.61	7.77
July	7.35	7.45	7.53	7.61	7.77
August	7.35	7.45	7.54	7.61	7.78
September	7.35	7.46	7.54	7.61	7.78
October	7.37	7.46	7.54	7.61	7.79
November	7.38	7.48	7.57	7.62	...
December	7.38	7.48	7.58	7.62	...
Average	7.35	7.43	7.53	7.61	...

The weighted average fare has further been recomputed for the past five years so as properly to join the averages as computed prior to 1926 with the revision on the basis of 1930 population. In such revision of the averages for 1926-1930, inclusive, it has been assumed that the change in population has occurred at a uniform rate during that period. The revised figures are shown in the accompanying table.

Digitized by Google

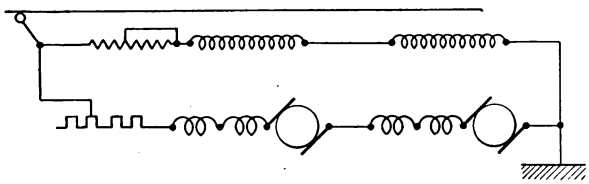
Regenerative Equipment

Planned for Paris Tramcars

Compound-wound motors with simplified control and use of automatic braking save 25 per cent of propulsion energy, besides increasing speed, reducing brake wear and maintenance. Recommendation for rebuilding all modern motors on the system was made as the result of extensive tests on twenty equipments

MODIFICATION of the electrical equipments of all the motor cars of the Société des Transports en Commun de la Région Parisienne, the government-controlled company that operates all transport facilities in Paris and vicinity, is contemplated by the management. It is proposed to change over the equipments on all of the cars having modern motors with commutating poles and capable of being converted into compound motors, the total motors involved being 2,350. A recommendation also has been made to the Department of the Seine, the governmental agency controlling the system, to retire 695 cars equipped with old-style motors and replace them with modern cars equipped with compound motors.

This information was made public at a special meeting of the Union Internationale de Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles (International Tramway and Bus Association), held on Oct. 21-22 at Paris for the purpose of inspecting the new type of equipments. L. Bacqueyrisse, general manager of operation and technical service of the system, made the announcement at the close of a paper in which he explained details of the new method. He stated that the results of the tests, which have been conducted on twenty cars in regular service following extended investigation, have shown that the new equipments have numerous advantages as compared with ordinary equipments of series motors with series-parallel control.



Schematic diagram of control for two compound motors as developed in Paris

The advantages are summarized as follows:

1. Reduction in cost of energy, averaging 25 per cent, resulting from (a) lower rheostatic losses at starting; (b) economical running at low constant speeds; (c) regeneration of energy on down grades and when reducing speed, as at stops; (d) ease of operation and lessened influence of the personal element of the motorman.
2. Reduction of maintenance expense resulting from the easy progression in starting and stopping, with elimination of jerks, and the lessened wear on the braking system and the wheel treads.
3. Increase in the schedule speed.
4. Electric braking.
5. Low cost of the electrical equipment, due to its simplicity and its low weight and reduced complication.

The tests, which were made in Paris during the past two years, were intended to prove whether a material saving could be shown from the specific consumption of the latest lightweight cars (Type L) used in Paris. These cars, equipped with series motors with series-parallel control, are of the single-truck type with differential axles and worm drive. The specific consumption, due to various improvements, is 43.2 watt-hours per ton-kilometer (63 watt-hours per ton-mile).

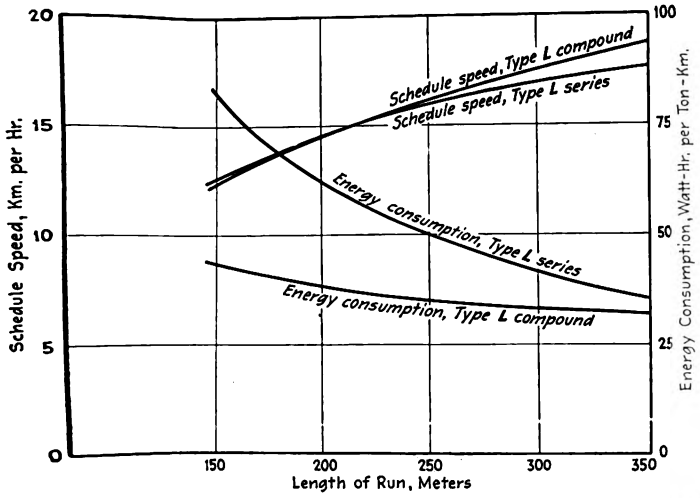
Since regenerative equipments proposed in the past seemed to present too many complications, the Paris engineers decided that a material simplification would be necessary, and adopted compound motors with simplified control. It was felt that, to be successful, the equipments should be suitable for lines of varying profile, under conditions of traffic congestion and with short distances between stops, and that acceleration and braking rates should be sufficiently high to give acceptable schedule speeds, all with no greater complication for the operator than with ordinary equipments. According to Mr. Bacqueyrisse, these requirements have all been realized.

Existing Equipment Was Rebuilt

In order to have a satisfactory equipment for regeneration, it was found that the characteristics should permit a wide speed range. This requires satisfactory commutation with the field unsaturated, necessitating a high ratio of field ampere turns to armature ampere turns, a large air gap, pole pieces of appropriate form, and a large number of commutator bars. Two motors were selected for the tests, TH-523 and TH-563, both constructed by the French Thomson-Houston Company. On account of the low continuous rating of the TH-523 motor (25 hp.), both field and armature windings were modified. The TH-563, designed for rheostatic braking and rated at 36 hp., required a change in the field windings only. The commutating fields were not disturbed in either motor.

The number of series field turns was reduced materially and shunt field windings were added. The arma-

Digitized by Google



Range of schedule speed and energy consumption, compound and series motor equipments

tures of the TH-523 motors were rewound with square wire instead of round wire, thus increasing the rating 27 per cent. The weights of the motors have not been changed to any considerable extent. Stand tests have shown that the motors develop equal or greater power. For the input corresponding to the balancing car resistance, the motors have a maximum speed range of 5 to 1 with various values of shunt field current. At this portion of the curve the efficiency is in the neighborhood of 88 per cent, which is the maximum for the series motor, while at maximum load the efficiency is 84 per cent.

The schematic connection diagram shows that the armatures, the series fields, the commutating fields and a starting resistance are all connected in series across the line. The shunt fields are connected in series with a regulating rheostat in the circuit. Starting is accomplished with full shunt field on the motors by cutting out the two steps of series armature resistance. Beyond this point increases in speed are made by weakening the shunt field by inserting resistance.

Reduction of shunt field resistance causes the armature to generate an electromotive force greater than that of the line, so that the armature generates current which is returned to the system. This return of energy evidently is accompanied by a reduction of speed as the kinetic energy is converted into electrical energy. A similar effect is produced when the car goes down a grade steep enough to more than overcome the car resistance.

The speed variation of 5 to 1, which corresponds, with the gear ratio adopted, to a range in car speed between 6 and 30 km.p.h. (3.7 and 18.6 m.p.h.), which keeps within the speed permitted by the authorities, permits elimination of the series-parallel transition and simplification of the control.

While the armatures might be connected in series or in parallel, it has been found advantageous to connect them in series to obtain equal division of load and reduce the voltage between commutator bars.

Regeneration of energy, effected by strengthening the shunt field, is readily carried down to about 8 km. p.h. (5 m.p.h.). At this point, only about 7 per cent of the energy in the car at 30 km.p.h. (18.6 m.p.h.) remains in the car. While it might be possible to regenerate down to very low speeds, the value of that procedure is questionable. It requires mechanisms that are heavy, complicated, and difficult to control, according to Mr. Bacqueyrisse.

Besides regeneration, a number of other important advantages are obtained. With the fields completely saturated, the minimum speed on full armature voltage is reduced, so that the series resistances and the rheostatic loss are much less than with series motors. For the same reason, low constant speeds can be obtained, which are useful for slow running on a congested street behind a line of traffic. The comfort of the passengers and wear and tear on the equipment are lessened by elimination of the large number of series resistance points and of the series-parallel transition. Also, with smoother starting and stopping, higher rates of acceleration and braking are feasible.

Elimination of coasting permits an increase in the average speed of the run along with lower energy consumption, as the energy is regenerated during the retardation period. This gain in speed is considered important under present-day conditions.

Braking, like starting, is obtained at high rates due to successive reductions in the shunt field resistance. Below 8 km.p.h. there are two steps of dynamic braking, which bring the car to standstill. On account of the shunt field it is not necessary to reverse the armatures, and the series fields are short-circuited to prevent any differential action. Air brakes are unnecessary, and there is a marked reduction in the cost of maintenance of brake shoes, wheels and brake rigging.

Control Equipment Simplified

The controller and wiring, shown diagrammatically, indicate the simplification of the connections. There is a main controller drum with ten running points, two rheostatic braking points and one off point; a reverser cylinder with five positions, two for forward and reverse movement, two for emergency braking only by short-circuiting the motors, and one off position; an interlock between the main drum and the reverser; a device for shunting the series fields, which permits variation of the ratio of series ampere turns to shunt ampere turns, on which depends the rate of regeneration and the stability of action. On the neutral position of the reverser, all circuits are dead; but on the off position of the main drum, a small current flows through the shunt field circuit so that surges from opening it at every stop are avoided. A voltage relay inserts a resistance in the shunt field circuit so as to limit the electromotive force generated to 675 volts in the event of the failure of power supply or a dewirement

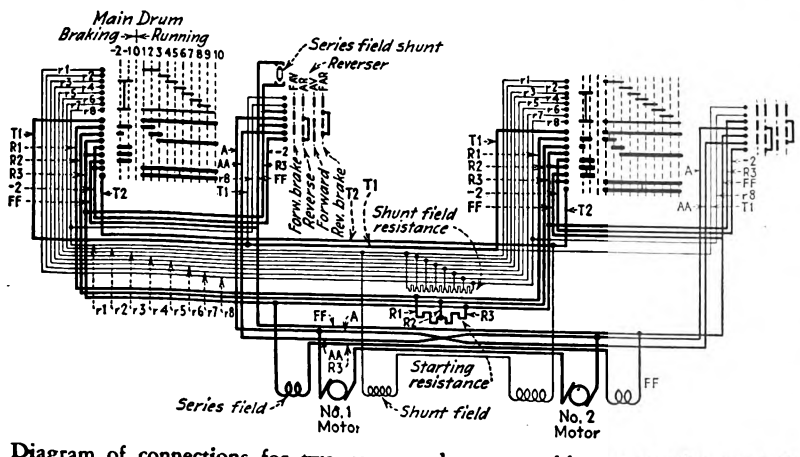
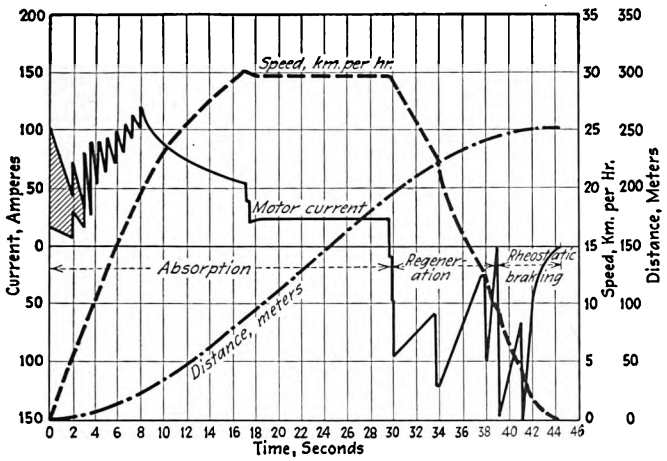
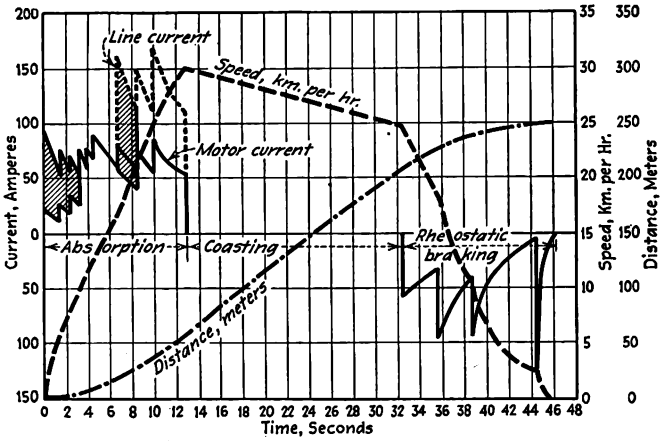


Diagram of connections for two compound motors with regenerative control

Digitized by Google





Comparative curves for a run of 250 meters. Results with compound motors at left and with series motors at right. Comparative figures are shown below

	Compound Motors	Series Motors
Time of run, seconds	44.9	46.4
Maximum speed, km.p.h.	30	30
Schedule speed, km.p.h. (10 seconds stop)	16.47	15.95
Energy absorbed from line, kw.	244	202.5
Energy regenerated	99.5	0
Energy taken, net	144.5	202.5
Energy used, watt-hours per ton-kilometer	35.4	49.7
Energy lost in resistance, watt-hours	28.6	50.2
Energy lost in resistance, per cent of input	11.5	24.8

of the trolley. There also are the usual cutout switches for use if one motor is disabled.

As may be seen, the wiring is greatly simplified. The total length of the power cables is reduced from 333 m. to 136 m. (1,100 ft. to 450 ft.), while the shunt excitation wiring is only 136 m. (450 ft.) of small wire.

Due to the reduction of weight of starting resistances, wiring, controllers, and series field shunting resistances, the weight of the car for regeneration is about 400 kg. (880 lb.) less than for an exactly similar car equipped with series motors.

Tests Show Material Savings

Tests were carried on with the first motor car changed over for more than 7,000 km. (4,300 miles) on the line between Porte de St. Cloud and Versailles. It was found that for the motor car alone the energy recuperated was 31 per cent of that taken from the line. On the up-grade trip the recovery was 18.5 per cent, while on the down-grade trip it was 59.5. The net saving compared with a car of exactly similar type under the same conditions of test, but fitted with series motors and series-parallel control, was 24 per cent. The specific consumptions of the two cars were 38.4 watt-hours per ton-kilometer (56 watt-hours per ton-mile) for the regenerative equipment and 50 watt-hours per ton-kilometer (73 watt-hours per ton-mile) with series motor equipment. The latter exceeds the average consumption for the system on account of the operating conditions imposed for the test.

Results obtained in normal passenger service have fully borne out the test predictions. It was found that a great advantage is the ability to run at any one of a number of constant speeds. This makes it possible to follow any traffic closely without successive applications of power and consequent jerking.

Energy consumption on the Louvre-Versailles line, which has a broken profile, showed a net saving of 27 per cent for the compound motor equipments hauling trailers, as compared with similar trains equipped with series motors. On Line 25, practically level throughout, but with heavy traffic congestion, Type G motor cars without trailers showed an energy saving of 23.8 per cent as compared with similar series motor equipments.

An important result found was that while there is considerable variation from the mean energy consumption with series motor equipments due to the personal element of the motorman, the individual runs with compound motor equipments ran much closer to the average.

The two speed-time curves reproduced indicate the results with the two types of equipment for a run of 250 meters, the limiting speed being 30 km.p.h. for each. The hatched areas represent the loss in starting resistance, which is 11.5 per cent for the compound motors and 24.8 per cent for the series motors. The net energy consumption per ton-kilometer was respectively 35.45 watt-hours for the compound motor equipment and 49.75 watt-hours per ton-kilometer for the series motor equipment. The schedule speeds are respectively 16.47 km.p.h. (10.21 m.p.h.) and 15.95 km.p.h. (9.89 m.p.h.), showing a gain of 3.3 per cent for the compound motor equipment.

Another study was made without the speed limitation of 30 km. The maximum speed attained in making the run of 250 km. was 35.5 km. (22.01 m.p.h.). The energy consumed was 26.68 watt-hours per ton-kilometer (43.1 watt-hours per ton-mile) for the compound motor equipment against 67.80 watt-hours per ton-kilometer (109 watt-hours per ton-mile) for the series motor equipment, the saving being 57.8 per cent. The ratio of energy regenerated to energy absorbed was 55.5 per cent.

It was pointed out by Mr. Bacqueyrisse that, contrary to the opinion frequently expressed, the compound motor behaves well with variations in line voltage. The compound motors are in use on a route which includes a section of underground conduit on which there are frequent breaks of the conductor rails with reversals of polarity.

It also was pointed out that the results were obtained with motors which were constructed from standard series motors with a minimum of modification. Motors designed specially for service undoubtedly would show better results. The series motors with which the new equipments were compared represented the latest designs of the manufacturers.

Studies made in Paris indicate that the cost of changing the equipments will be amortized in 6⅔ years on account of the economies. It also was stated that the use of compound motors should be of even greater advantage on rapid transit lines.

Digitized by Google

Monthly and Other Financial Reports

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
San Diego Electric Railway, San Diego, Cal.					
September, 1930	124,805	105,491	9,451	21,480	*9,835*
September, 1929	133,066	107,685	9,818	25,918	*4,278*
9 mo. end. Sept., 1930.	1,190,671	1,010,972	87,864	192,773	*88,650*
9 mo. end. Sept., 1929.	1,215,071	1,007,805	89,126	208,856	*63,392*
San Diego Electric Railway, San Diego, Cal.					
October, 1930	126,158	118,289*a*	.....	7,869	*14,559*
October, 1929	136,394	121,840*a*	.....	14,554	*6,067*
12 mo. end. Oct., 1930.	1,316,829	1,217,125*a*	.....	99,704	*103,210*
12 mo. end. Oct., 1929.	1,351,466	1,218,771*a*	.....	132,695	*69,460*
Market Street Railway, San Francisco, Cal.					
October, 1930	786,012	675,908*a*	.....	110,104	57,384
October, 1929	843,134	680,318*a*	.....	162,816	105,444
12 mo. end. Oct., 1930.	9,308,522	6,899,998*a*	.....	1,408,524	745,252
12 mo. end. Oct., 1929.	9,568,360	8,110,157*a*	.....	1,458,203	714,225
Northwestern Pacific Railroad, Sausalito, Cal.					
September, 1930	548,282	435,809	35,848	76,617	16,471*g*
September, 1929	599,699	453,698	36,539	109,436	100,287*g*
9 mo. end. Sept., 1930.	4,354,154	3,760,439	324,119	269,251	196,523*g*
9 mo. end. Sept., 1929.	4,649,603	3,997,698	339,035	312,508	279,612*g*
Denver Tramway Corporation, Denver, Col.					
9 mo. end. Sept., 1930.	2,987,628	2,062,237	365,164	594,594	220,145
9 mo. end. Sept., 1929.	3,141,662	2,148,576	370,836	657,995	271,841
9 mo. end. Sept., 1928.	3,204,631	2,104,581	379,845	747,041	377,512
9 mo. end. Sept., 1927.	3,272,495	1,819,947	383,595	1,101,710	734,815
Capital Traction Co., Washington, D. C. (Revised)					
September, 1930	327,713	243,059	25,007	60,389	30,259
September, 1929	330,038	247,256	25,205	58,534	28,342
9 mo. end. Sept., 1930.	3,073,934	2,260,967	233,635	595,428	320,390
9 mo. end. Sept., 1929.	3,194,057	2,295,305	245,880	671,437	396,899
Capital Traction Co., Washington, D. C.					
October, 1930	374,646	256,781	31,570	86,287	58,638
October, 1929	370,108	263,356	29,329	77,423	49,881
10 mo. end. Oct., 1930.	3,448,581	2,517,748	265,214	665,618	379,028
10 mo. end. Oct., 1929.	3,564,166	2,558,662	275,210	730,293	446,781
Jacksonville Traction Co., Jacksonville, Fla.					
September, 1930	78,529	69,098	5,914	3,199	.....
September, 1929	86,811	75,242	9,195	1,975	.....
12 mo. end. Sept., 1930	1,006,294	870,254	102,718	87,151	*66,935*
12 mo. end. Sept., 1929	1,156,423	945,703	107,646	96,730	*61,336*
Honolulu Rapid Transit Co., Honolulu, Hawaii					
September, 1930	83,394	50,641	9,149	24,748	12,429
September, 1929	86,253	49,266	7,843	30,398	19,174
9 mo. end. Sept., 1930.	777,205	458,684	80,604	249,102	143,520
9 mo. end. Sept., 1929.	790,028	452,433	82,079	265,442	164,388
Chicago Surface Lines (Corrected)					
September, 1930	4,568,564	3,789,472*a*	.....	779,092	713,323*b*
September, 1929	5,048,005	4,011,031*a*	.....	1,036,973	819,277*b*
Chicago Surface Lines, Chicago, Ill.					
October, 1930	4,879,570	3,933,416*a*	.....	446,153	799,118*b*
October, 1929	5,469,617	4,244,885*a*	.....	1,224,731	916,198*b*
United Railways & Electric Co., Baltimore, Md.					
September, 1930	1,261,734	.....	.....	.....	10,050
September, 1929	1,352,582	.....	.....	.....	41,549
9 mo. end. Sept., 1930.	12,192,062	.....	.....	.....	329,610
9 mo. end. Sept., 1929.	12,378,256	.....	.....	.....	294,410
United Railways & Electric Co., Baltimore, Md.					
October, 1930	1,354,086	908,575	140,731	314,726	25,163
October, 1929	1,460,077	962,111	140,656	371,860	87,260
10 mo. end. Oct., 1930.	13,546,148	9,272,611	1,292,968	2,269,574	354,773
10 mo. end. Oct., 1929.	13,838,333	9,443,190	1,340,756	2,355,616	381,670
Boston Elevated Railway, Boston, Mass.					
September, 1930	2,470,918	1,948,236	143,482	384,345	*316,296*
September, 1929	2,568,068	1,950,523	130,327	492,721	*197,825*
3 mo. end. Sept., 1930.	7,122,393	5,871,539	441,445	835,021	*1,272,087*
3 mo. end. Sept., 1929.	7,538,121	5,941,713	380,922	1,237,844	*845,378*
9 mo. end. Sept., 1930.	24,164,768	17,576,058	1,236,277	5,436,424	*893,527*
9 mo. end. Sept., 1929.	25,095,812	17,963,601	1,243,875	5,953,226	*321,767*
Boston, Revere Beach & Lynn R.R., Boston, Mass.					
3 mo. end. Sept., 1930.	366,517	270,579	9,000	87,542	51,873
3 mo. end. Sept., 1929.	384,692	266,875	10,077	108,662	72,006
9 mo. end. Sept., 1930.	967,478	768,568	27,000	173,634	66,323
9 mo. end. Sept., 1929.	985,149	748,801	30,076	208,235	97,801
Eastern Massachusetts Street Railway, Boston, Mass.					
September, 1930	612,237	421,570	26,900	175,174	21,771
September, 1929	659,140	412,023	32,552	232,698	74,466
9 mo. end. Sept., 1930.	5,943,714	3,839,296	261,442	1,935,281	400,013
9 mo. end. Sept., 1929.	6,472,825	4,045,689	291,685	2,302,285	716,216
Eastern Massachusetts Street Railway, Boston, Mass.					
October, 1930	623,872	440,793	26,980	167,101	15,811
October, 1929	681,561	465,240	26,731	215,385	67,947
10 mo. end. Oct., 1930.	6,567,586	4,280,090	288,422	2,102,387	413,824
10 mo. end. Oct., 1929.	7,154,387	4,510,930	318,416	2,517,670	784,163
Fitchburg & Leominster Street Ry., Fitchburg, Mass.					
3 mo. end. Sept., 1930.	66,806	56,388*a*	.....	10,418	2,347
3 mo. end. Sept., 1929.	82,586	62,183*a*	.....	20,403	12,025
9 mo. end. Sept., 1930.	219,329	170,568*a*	.....	48,761	31,780
9 mo. end. Sept., 1929.	256,565	188,612*a*	.....	69,953	52,027
Boston, Worcester & New York Street Ry., Framingham, Mass.					
3 mo. end. Sept., 1930.	244,728	216,288	4,875	23,985	10,125
3 mo. end. Sept., 1929.	213,828	177,546	5,149	40,863	27,003
9 mo. end. Sept., 1930.	595,904	538,984	14,625	44,344	2,764
9 mo. end. Sept., 1929.	557,455	189,125	14,899	64,287	22,717
Holyoke Street Railway, Holyoke, Mass.					
3 mo. end. Sept., 1930.	124,968	117,617*a*	.....	13,024	*7,581*
3 mo. end. Sept., 1929.	160,897	123,393*a*	.....	43,846	23,165
9 mo. end. Sept., 1930.	440,179	408,921*a*	.....	47,722	*13,787*
9 mo. end. Sept., 1929.	534,785	458,613*a*	.....	93,660	31,540
Union Street Railway, New Bedford, Mass.					
3 mo. end. Sept., 1930.	273,426	254,258	14,770	4,398	*869*
3 mo. end. Sept., 1929.	339,280	280,753	14,833	43,694	39,483
9 mo. end. Sept., 1930.	851,963	790,701	44,402	16,860	105
9 mo. end. Sept., 1929.	972,812	837,576	43,877	91,359	80,276
Middesex & Boston Street Railway, Newtonville, Mass.					
3 mo. end. Sept., 1930.	242,378	220,058*a*	.....	22,320	*12,092*
3 mo. end. Sept., 1929.	260,095	239,424*a*	.....	20,671	*18,363*
9 mo. end. Sept., 1930.	842,891	701,053*a*	.....	141,838	30,648
9 mo. end. Sept., 1929.	859,897	748,718*a*	.....	111,179	*5,659*
Berkshire Street Railway, Pittsfield, Mass.					
3 mo. end. Sept., 1930.	144,178	136,112	6,540	1,526	*70,519*
3 mo. end. Sept., 1929.	163,747	146,186	5,087	12,474	*60,811*
9 mo. end. Sept., 1930.	501,772	415,489	17,524	68,759	*146,937*
9 mo. end. Sept., 1929.	537,564	444,300	16,660	76,604	*143,889*
Springfield Street Railway, Springfield, Mass.					
3 mo. end. Sept., 1930.	537,573	461,704	8,529	68,488	*1,190*
3 mo. end. Sept., 1929.	626,595	531,340	8,874	88,549	15,687
9 mo. end. Sept., 1930.	1,831,930	1,460,594	26,888	348,602	137,786
9 mo. end. Sept., 1929.	2,037,851	1,651,619	29,258	363,465	144,820
Worcester Consolidated Street Railway, Worcester, Mass.					
3 mo. end. Sept., 1930.	622,472	499,582	14,001	111,917	9,142
3 mo. end. Sept., 1929.	708,871	598,637	15,871	100,390	*15,118*
9 mo. end. Sept., 1930.	2,123,978	1,587,282	51,778	493,638	181,429
9 mo. end. Sept., 1929.	2,290,248	1,767,798	60,282	380,019	134,805
Department of Street Railways, Detroit, Mich.					
September, 1930	1,510,161	1,372,715	63,460	92,357	*51,711*
September, 1929	2,049,235	1,580,632	62,327	415,660	270,798
12 mo. end. Sept., 1930	22,594,711	18,736,157	771,714	3,216,793	1,490,094
12 mo. end. Sept., 1929	26,715,667	21,169,937	750,968	4,947,077	3,253,351
Department of Street Railways, Detroit, Mich.					
October, 1930	1,579,476	1,394,777	63,461	125,350	22,933
October, 1929	2,129,774	1,652,130	61,936	425,792	276,683
12 mo. end. Oct., 1930	22,044,413	18,478,804	773,239	2,916,351	1,190,479
12 mo. end. Oct., 1929	26,684,738	21,145,235	749,469	4,927,723	3,251,132
Twin City Rapid Transit Co., Minneapolis, Minn.					
3 mo. end. Sept., 1930.	2,731,434	2,213,720	.....	517,714	*48,883*
3 mo. end. Sept., 1929.	3,042,990	2,423,575	.....	619,414	38,008
9 mo. end. Sept., 1930.	9,330,401	6,979,728	.....	2,350,673	596,403
9 mo. end. Sept., 1929.	10,056,521	7,509,913	.....	2,546,607	724,932
Kansas City Public Service Co., Kansas City, Mo.					
September, 1930	650,114	482,649	41,675	125,788	50,261
September, 1929	722,167	596,603*a*	.....	125,563	50,936
9 mo. end. Sept., 1930.	6,187,103	4,830,712	375,075	981,315	278,663
9 mo. end. Sept., 1929.	6,672,155	5,423,974*a*	.....	1,248,181	547,416
Illinois Terminal Company, St. Louis, Mo.					
September, 1930	654,477	420,703	34,115	199,646	160,897*g*
September, 1929	690,722	481,979	23,349	185,394	140,347*g*
9 mo. end. Sept., 1930.	5,679,166	3,935,379	268,680	1,474,987	1,093,870*g*
9 mo. end. Sept., 1929.	6,165,591	4,282,384	211,046	1,672,034	1,246,554*g*
Omaha & Council Bluffs Street Ry., Omaha, Neb.					
September, 1930	227,147	151,009	32,950	43,188	1,780
September, 1929	210,319	159,722	29,347	21,250	*19,377*
International Railway, Buffalo, N. Y.					
9 mo. end. Sept., 1930.	7,489,380	6,376,201*a*	.....	1,190,577	244,016
9 mo. end. Sept., 1929.	8,333,955	6,845,033*a*	.....	1,558,991	587,567
Fonda Johnstown & Gloversville R.R., Gloversville, N. Y.					
September, 1930	72,267	58,749	4,800	21,874	*8,497*
September, 1929	81,673	59,354	7,840	29,068	*1,585*
9 mo. end. Sept., 1930.	682,484	553,470	43,200	161,427	*117,786*
9 mo. end. Sept., 1929.	754,581	571,060	70,560	217,960	*68,894*
Brooklyn-Manhattan Transit Corporation, New York, N. Y. (h)					
October, 1930	5,036,775	3,250,290	322,263	1,525,903	758,817
October, 1929	5,170,393	3,390,008	339,676	1,509,042	738,262
4 mo. end. Oct., 1930	19,612,226	12,870,348	1,323,218	5,693,867	2,611,586
4 mo. end. Oct., 1929	20,223,779	13,676,546	1,322,535	5,500,031	2,378,872
Brooklyn & Queens Transit System, New York, N. Y.					
October, 1930	1,922,388	1,504,462	92,704	338,881	214,924
October, 1929	2,027,618	1,567,260	123,076	358,486	232,939
4 mo. end. Oct., 1930	7,554,244	5,932,597	427,989	1,250,523	752,950
4 mo. end. Oct., 1929	8,003,595	6,325,119	467,215	1,296,394	797,039
Hudson & Manhattan R.R., New York, N. Y.					
October, 1930	1,033,584	521,325*a*	.....	512,259	176,999
October, 1929	1,081,539	531,801*a*	.....	549,738	215,297
10 mo. end. Oct., 1930.	10,149,014	5,136,027*a*	.....	5,012,987	1,662,893
10 mo. end. Oct., 1929.	10,346,171	5,230,051*a*	.....	5,116,120	1,759,302

Digitized by Google

	Operating Revenue $	Operating Expenses $	Taxes $	Gross Income $	Net Income $
Interborough Rapid Transit Co., New York, N. Y.					
September, 1930.....	5,684,267	3,783,327	200,041	1,700,898	100,600*e*
September, 1929.....	5,674,364	3,497,917	198,552	1,977,895	355,407*e*
3 mo. end. Sept., 1930.	16,249,981	11,587,292	596,144	4,066,544	*720,722e*
3 mo. end. Sept., 1929.	16,573,468	11,000,135	597,574	4,975,758	238,625*e*
Interborough Rapid Transit Co., New York, N. Y.					
October, 1930.....	6,315,679	3,960,101	202,559	2,153,017	161,417*k*
October, 1929.....	6,387,991	3,995,255	202,126	2,190,638	*150,664k*
4 mo. end. Oct., 1930..	22,565,660	15,547,394	798,704	6,219,562	*1,254,917k*
4 mo. end. Oct., 1929..	22,961,459	14,995,361	799,700	7,166,397	*607,651k*
Long Island Railroad, New York, N. Y.					
September, 1930.....	3,589,671	2,059,404	407,652	1,121,855	928,655*g*
September, 1929.....	3,783,730	2,240,102	376,383	1,166,275	994,058*g*
9 mo. end. Sept., 1930.	30,365,004	19,910,756	2,549,408	7,898,588	6,459,733*g*
9 mo. end. Sept., 1929.	31,552,785	20,420,266	2,353,853	8,762,877	7,330,442*g*
New York Railways Corporation, New York, N. Y.					
September, 1930.....	489,649	415,904*a*	.....	73,745	34,367*f*
September, 1929.....	535,117	453,486*a*	.....	81,631	20,554*f*
9 mo. end. Sept., 1930.	4,164,521	3,743,317*a*	.....	421,204	58,952*f*
9 mo. end. Sept., 1929.	4,696,094	4,110,345*a*	.....	585,749	38,244*f*
New York, Westchester & Boston R.R., New York, N. Y.					
September, 1930.....	203,617	138,756	26,500	38,949	*192,861*
September, 1929.....	221,654	130,829	24,249	69,469	*148,893*
9 mo. end. Sept., 1930.	1,908,521	1,093,609	230,059	592,452	*1,481,193*
9 mo. end. Sept., 1929.	1,892,809	1,148,211	201,856	551,519	*1,386,275*
Staten Island Rapid Transit Co., New York, N. Y.					
September, 1930.....	206,908	148,525	17,000	41,383	26,127
September, 1929.....	246,192	156,008	18,000	72,184	66,529
9 mo. end. Sept., 1930.	1,886,202	1,392,793	154,509	337,392	251,624
9 mo. end. Sept., 1929.	1,995,299	1,492,936	158,800	343,546	288,108
Third Avenue Railway System, New York, N. Y.					
September, 1930.....	1,428,136	1,072,978	94,550	285,176	45,636
September, 1929.....	1,479,475	1,194,193	96,882	215,111	*25,651*
3 mo. end. Sept., 1930.	4,207,931	3,277,815	282,879	719,749	1,163
3 mo. end. Sept., 1929.	4,421,944	3,612,769	289,031	595,501	*123,071*
Third Avenue Railway System, New York, N. Y.					
October, 1930.....	1,456,688	1,107,713	97,742	275,552	36,257
October, 1929.....	1,517,873	1,222,675	98,794	222,316	16,704
4 mo. end. Oct., 1930....	5,664,620	4,385,529	380,622	995,301	37,421
4 mo. end. Oct., 1929....	5,939,818	4,835,446	387,825	817,818	139,775
Cincinnati Street Ry., Cincinnati, Ohio					
September, 1930.....	644,206	436,728	57,867	161,332	*24,702c*
Philadelphia & Western Ry., Norristown, Pa.					
September, 1930.....	55,413	.....	.....	.....	8,901
September, 1929.....	65,444	.....	.....	.....	13,851
9 mo. end. Sept., 1930.	506,200	.....	.....	.....	46,777
9 mo. end. Sept., 1929.	586,239	.....	.....	.....	103,699
Philadelphia Rapid Transit System, Philadelphia, Pa.					
3 mo. end. Sept., 1930.	11,611,770	9,123,677*a*	.....	2,703,442	*947,553j*
3 mo. end. Sept., 1929.	12,733,299	9,671,473*a*	.....	3,380,867	*432,588j*
9 mo. end. Sept., 1930.	38,866,294	29,643,722*a*	.....	9,874,368	*1,103,534j*
9 mo. end. Sept., 1929.	41,174,435	31,217,949*a*	.....	10,917,049	*542,381j*
York Railways, York, Pa.					
3 mo. end. Sept., 1930.	648,877	390,478*a*	.....	258,399	183,159
3 mo. end. Sept., 1929.	626,140	377,139*a*	.....	249,001	173,243
12 mo. end. Sept., 1930	2,953,469	1,687,112*a*	.....	1,266,357	949,589
12 mo. end. Sept., 1929	2,795,190	1,555,553*a*	.....	1,239,637	946,514
United Electric Railways, Providence, R. I.					
September, 1930.....	493,296	434,036*a*	.....	59,260	8,376
September, 1929.....	565,164	484,253*a*	.....	80,911	29,971
9 mo. end. Sept., 1930.	4,875,804	3,576,297*a*	.....	1,299,507	51,768
9 mo. end. Sept., 1929.	5,368,202	3,805,230*a*	.....	1,562,972	316,682
Texas Electric Railway, Dallas, Texas					
3 mo. end. Sept., 1930.	1,215,160	822,201*a*	.....	392,959	33,049
3 mo. end. Sept., 1929.	1,334,560	856,992*a*	.....	477,568	112,107
Galveston-Houston Electric Ry., Houston, Texas					
August, 1930.....	47,425	.....	.....	19,021	.....
August, 1929.....	58,563	.....	.....	22,652	.....
12 mo. end. Aug., 1930	529,519	308,932	32,524	188,256	*82,136d*
12 mo. end. Aug., 1929	605,660	336,470	31,849	237,340	*55,950d*
Galveston-Houston Electric Ry., Houston, Texas					
September, 1930.....	42,823	25,750	2,302	14,770	.....
September, 1929.....	51,275	30,974	2,720	17,580	.....
12 mo. end. Sept., 1930.	521,067	303,706	32,106	185,273	84,893
12 mo. end. Sept., 1929.	604,191	337,023	31,638	235,702	34,731
Edmonton Radial Railway, Edmonton, Alta.					
9 mo. end. Sept., 1930.	604,032	408,669	.....	195,363	*6,842*
9 mo. end. Sept., 1929.	.....	.....	.....	.....	7,400
Houston Electric Co., Houston, Texas					
September, 1930.....	251,919	154,195	21,710	76,012	.....
September, 1929.....	276,779	169,482	26,887	80,409	.....
12 mo. end. Sept., 1930	3,170,217	1,994,406	245,279	946,051	571,857
12 mo. end. Sept., 1929	3,388,716	2,091,045	291,868	1,009,668	607,277
British Columbia Electric Railway, Vancouver, B. C.					
September, 1930.....	1,206,579	618,594*a*	.....	587,985	.....
September, 1929.....	1,169,278	637,436*a*	.....	531,842	.....
3 mo. end. Sept., 1930.	3,597,208	1,904,515*a*	.....	1,692,693	.....
3 mo. end. Sept., 1929.	3,494,752	1,919,200*a*	.....	1,575,552	.....
Guelph Radial Railway, Guelph, Ont.					
10 mo. end. Aug., 1930	73,019	68,248	854	3,917	*26,929*
10 mo. end. Aug., 1929	.....	.....	.....	.....	*26,132*
Ontario Hydro Electric Railways, Essex District, Windsor, Ont.					
10 mo. end. Aug., 1930	883,799	750,490	4,948	128,361	*98,949*
10 mo. end. Aug., 1929	.....	.....	.....	.....	43,245
Havana Electric Railway, Havana, Cuba					
3 mo. end. Sept., 1930.	1,324,517	1,111,696*a*	.....	216,603	59,455*d*
3 mo. end. Sept., 1929.	1,388,840	1,156,789*a*	.....	239,736	78,771*d*
9 mo. end. Sept., 1930.	4,011,646	3,356,172*a*	.....	670,396	195,361*d*
9 mo. end. Sept., 1929.	4,253,421	3,442,786*a*	.....	833,346	350,444*d*
Mexico Tramways, Mexico City, Mex. (In Pesos)					
September, 1930.....	817,520	918,940*a*	.....	*101,420*	.....
September, 1929.....	865,671	859,179*a*	.....	6,492	.....
9 mo. end. Sept., 1930.	7,541,310	8,133,150*a*	.....	*591,840*	.....
9 mo. end. Sept., 1929.	8,128,558	7,995,204*a*	.....	133,354	.....
Saskatoon Municipal Railway, Saskatoon, Sask.					
8 mo. end. Aug., 1930..	252,508	178,751	9,886	63,871	*27,460*
8 mo. end. Aug., 1929..	.....	.....	.....	.....	9,902
Lethbridge Municipal Railway, Lethbridge, Alta.					
7 mo. end. July, 1930...	31,788	27,829	.....	3,959	*14,137*
7 mo. end. July, 1929...	.....	.....	.....	.....	*10,944*

Italic figures indicate deficit. *a* Includes taxes. *b* Balance for return on investment *c* Withdrawn from fare control fund. *d* Before depreciation. *e* Before Manhattan 5% dividend. *f* Before income bond interest, and in 1930 before Broadway and Seventh Ave. bond interest in default. *g* Net after rents. *h* Including Brooklyn & Queens Transit System. *j* After fixed charges and dividends. *k* After Manhattan Elevated rental.

A.E.R.A. Executive Committee Meets in New York

CONSIDERATION of matters of national and local policy and the reports of committees constituted the principal business of the executive committee, A.E.R.A., at its meeting held in New York on Nov. 20.

C. D. Cass, general counsel, told of efforts to enlist action of member and non-member electric railways on behalf of an effort to secure from the government increased mail pay. There has been, he stated, no increase in mail pay to electric railways since 1925, although steam railroads less than 100 miles in length were granted an increase in 1928. The Parker bill for regulating interstate bus and truck operation, Mr. Cass reported, is still pending before a committee of the U. S. Senate. All recommendations on Referendum No. 57, being the report of a special committee of the United States Chamber of Commerce on water power development, were approved.

Contract for the use of the Atlantic City auditorium for the 1931 Convention has been signed, and arrangements for entertainment and meetings were well under way. Representatives of a score or more of the leading manufacturers, constituting the exhibit committee, have assured a large exhibit by agreeing to take as much or more space as their respective companies had used at the previous exhibit.

Leslie Vickers, economist, told of a recent meeting of the committee on fare structure, at which a resolution was passed soliciting the full support of the executive committee in obtaining from state and local regulatory bodies a wide degree of leeway in permitting local street railway companies to engage in fare experimentation.

Edward Dana, reporting for the committee on employee relations, stated that a foremen's training conference had been arranged for the Chicago area, and that preparations for holding similar training classes in other sections of the country were under way.

Digitized by Google

Cleaning Cars and Equipment by Sand Blast Saves Much Time and Money

SANDBLASTING of car equipment of the Pacific Electric Railway has proved more efficient and cheaper than the method of hand cleaning formerly used. Particularly in the cleaning of trucks its advantages are outstanding. Total elimination of all grease and dirt is possible, and all parts of the truck are cleaned down to the metal, affording better opportunity for the detection of fractures. Because all dirt and grease are confined to the sandblasting room, and not scattered around the main shops, general cleaning of equipment by sandblasting has improved the appearance and cleanliness of the repair shops on this property.

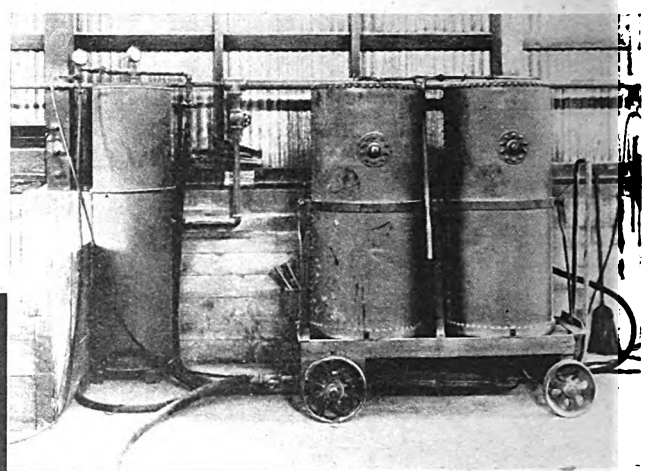
The bodies of both passenger and freight cars are cleaned by sandblasting, as well as trucks, armature coils, brush-holders, resistance grids, air hose couplings and many other parts. Hard, sharp silica sand is the cleaning medium used. This sand is cleaned and placed in two tanks which are mounted on a small hand truck. The tanks are used alternately; when one tank is emptied the nozzle line is shifted to the other tank. The tops of the tanks are concave to facilitate filling. A working pressure of 90 lb. is obtained from the shop air line. The rest of the equipment consists of a shop-made nozzle, and 1½-in. heavy hose connected to a 1-in. pipe, which is further reduced to ¼ in. by means of a reducing coupling before it is connected to the supply tank. Two men are required to perform the regular cleaning of equipment. One man operates the nozzle; the other screens the sand and maintains a supply for the nozzle line. Miscellaneous cleaning is done by helpers as the occasion requires.

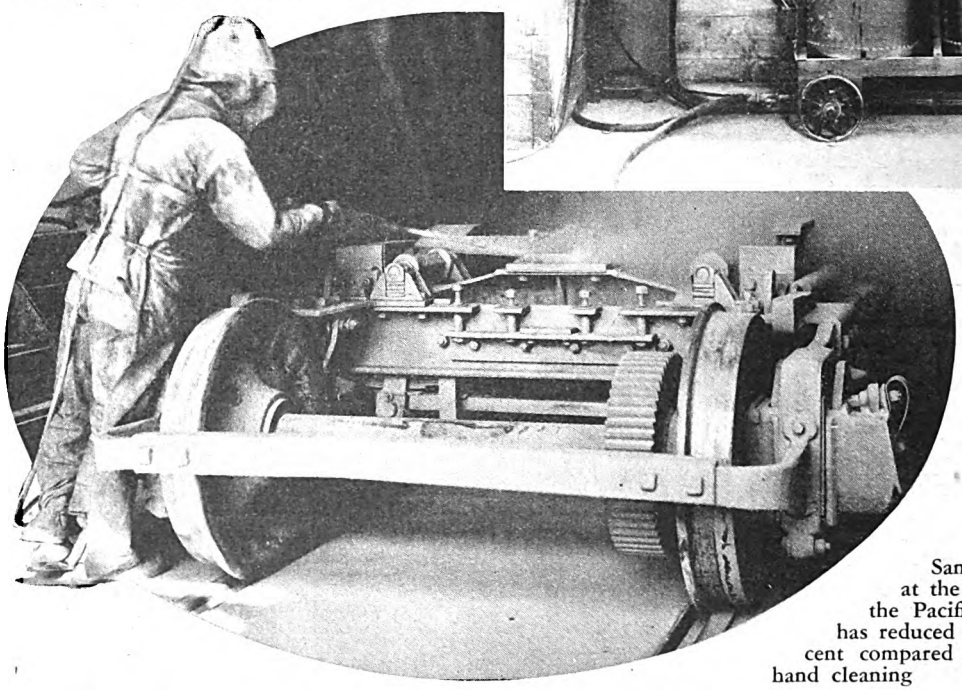
Except for trucks of passenger cars, no preliminary preparation is necessary in the cleaning of the equipment. It is taken into the sandblasting room and cleaned with little handling. Journals and the motor axle bearings of passenger car trucks are covered to protect them against the scouring action of the sandblast. The operator is protected with a Pulmosian helmet which covers the head and shoulders, and has a small air inlet in the top to provide ventilation.

The principal advantage of sandblasting is the saving in labor, as may be seen by comparing the labor time necessary for other cleaning methods. With the old method passenger cars were cleaned by removing the paint by means of a varnish remover, or by burning it off with a torch. This operation required the employment of four men for two days. Trucks were scraped of heavy mud or grease by hand requiring two men at least one day. Steel freight cars were cleaned by means of wire brushes, scrapers and putty knives, with a labor time of approximately 40 man-hours. Three man-hours were required to clean stripped armature cores with wire brushes and scrapers. Time required for typical cleaning operations with two men by means of sandblasting is as follows:

Steel passenger cars, including roofs and trucks	14 hours
Steel freight cars, complete	4 hours
Passenger car trucks, per car	4 hours
Steel gondolas, including trucks and frames	8 hours
Stripped armature cores	15 minutes
Brush-holders, resistance grids, air line hose couplings	2 to 5 minutes per article

Two supply tanks are used in the sandblasting operation. One is connected to the nozzle line, the other serves as a reserve





Sandblasting of trucks at the Torrance Shops of the Pacific Electric Railway has reduced labor about 50 per cent compared to the method of hand cleaning

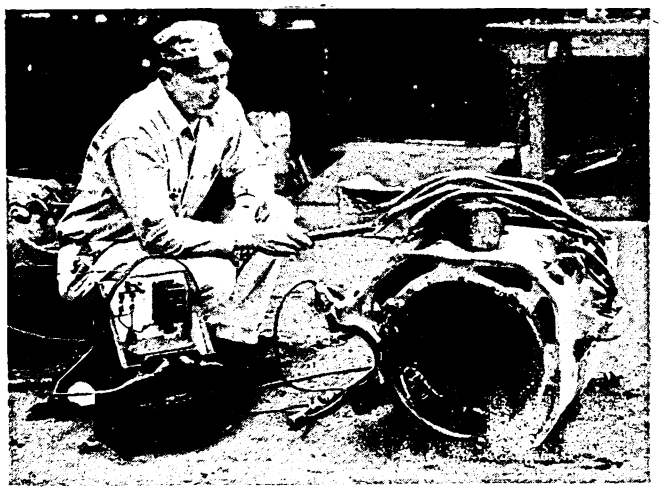
Digitized by Google

Insulation Tested with Portable Transformer*

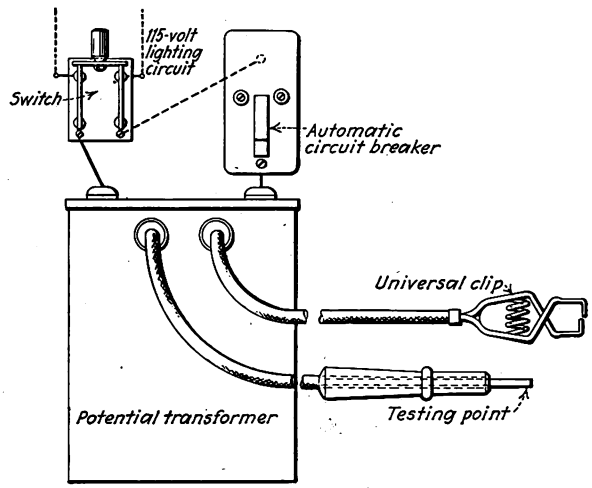
By A. Taurman

Superintendent of Equipment, Way and Structures
Birmingham Electric Company, Birmingham, Ala.

FIELD coils of motors, as well as motor leads, brushholders, car cables, starting rheostats and other electrical equipment, are tested for grounds with a portable potential transformer set connected to a lighting circuit in the shops of the Birmingham Electric Company. The field coils are tested when the motors are overhauled without the necessity of moving the motor to the electric testing shop, and the auxiliary equipments are tested on the car.



Much handling of equipment is eliminated by testing insulation with a portable transformer set in the shops of the Birmingham Electric Company



The potential transformer has a transforming ratio of 1:11, which makes available a sufficiently large voltage for insulation test from the ordinary lighting circuit

The set used consists of a 200-watt potential transformer of the switchboard type which was modified to suit requirements, a double-pole single-throw knife switch, a 15-volt, 25 amp. cap, and an automatic circuit breaker set to trip at 20 amp. The latter are mounted with the transformer in a wooden box to which is attached a convenient leather handle. The primary 115-volt winding of the transformer is equipped with a No. 14 lamp cord and attachment plug for connection to the lighting circuit. This connection is made from the transformer through the knife switch and circuit breaker. Highly insulated leads of suitable length are brought out from the secondary winding of the transformer to be attached to equipment for test. One lead is equipped with a 50-amp. universal clip, the other with a testing point. The transformer is wound for a ratio of 1:11, producing a voltage ranging from 1,250 to 1,265 volts on the secondary, with a 115-volt primary. If higher voltage is required, the secondary may be wound for a higher ratio, or may be split for different ratios.

Weighing only 35 lb., the complete set can be carried about easily and tests may be made wherever it is suitable. The test is easily and quickly made. The universal clip is attached to the motor frame, and contact is made between testing point and field terminal, holding the contact from 20 to 30 seconds. If the insulation of the field coil breaks down, the circuit breaker will trip and open the primary circuit.

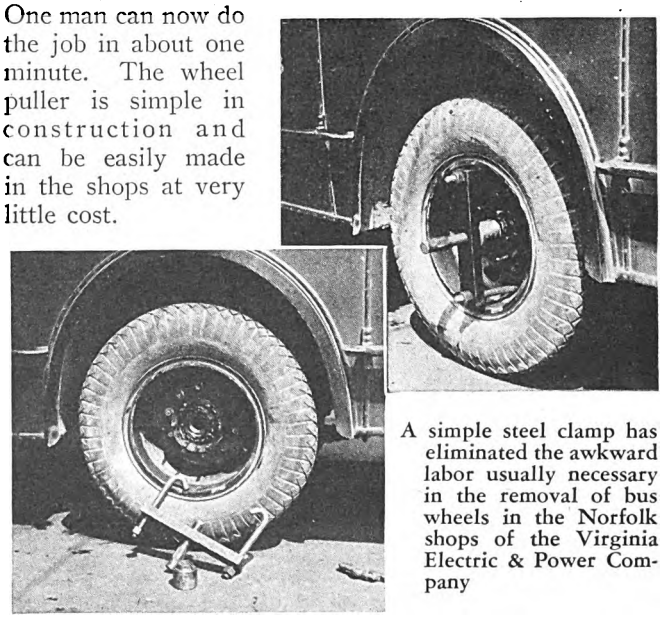
**Submitted in* Electric Railway Journal *Prize Contest.*

Bus Wheels Removed With a Simple Clamp*

By C. B. Hall

Chief Clerk Mechanical Department
Virginia Electric & Power Company, Norfolk, Va.

REMOVAL of wheels from the Model 65-A White bus is facilitated by the use of a wheel puller designed by the mechanical department of the Virginia Electric & Power Company, Norfolk, Va. This device is primarily an adjustable steel clamp made with 1-in. steel rod fitted into a body piece measuring 18x3x1½ in., which has a hexagon head screw 8½ in. long, threaded at the center. The diameter of the screw is 1½ in. A steel cylinder 3½ in. long is machined with a socket end for taking the screw, and a ¾-in. projecting plug end for insertion against the axle tubing. By turning the screw with a wrench against the cylinder and having the clamp ends tightened, the wheel is easily and quickly removed from the axle. Wheels were formerly removed with a jack and tools, requiring the labor of three men for from 30 to 45 minutes. One man can now do the job in about one minute. The wheel puller is simple in construction and can be easily made in the shops at very little cost.



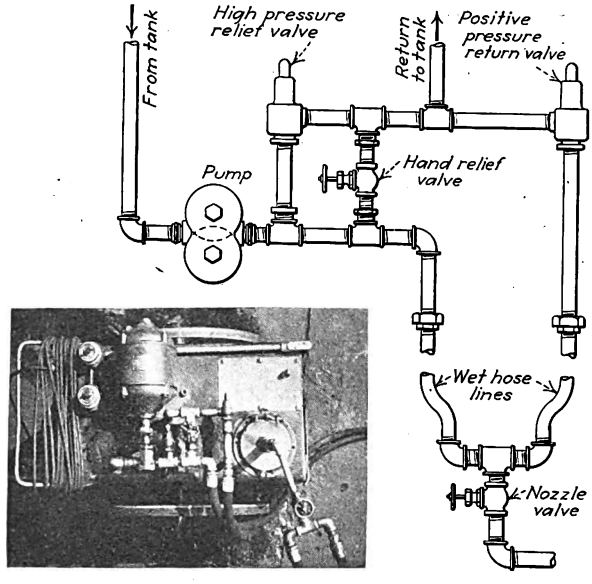
A simple steel clamp has eliminated the awkward labor usually necessary in the removal of bus wheels in the Norfolk shops of the Virginia Electric & Power Company

Digitized by Google

Pump and Heater Facilitate Transmission Filling*

By Leonard S. Rose
Assistant Superintendent Motor Coach Department
Cleveland Railway

FILLING of transmissions and differentials on buses operated by the Cleveland Railway has been facilitated by the use of a lubricant pump and heater developed by the motor coach department. Lubricant for the transmission and differential is carried in a standard rectangular oil buggy. On this a small direct-driven gear pump has been mounted. The output from the pump is delivered to a "wet hose" line, with a return hose to the tank which operates against a positive pressure return valve. Use of the wet hose return permits circulation of warm lubricant through the hose line so that the grease is fluid at the filling nozzle, even though some time elapses between periods of use. A



Positive delivery of lubricants to the bus transmission or differential is insured by use of this motor driven pump and heater combination

high-pressure relief valve protects the motor from overloads caused by the presence of cold grease in the hose line. The positive pressure valve insures a minimum delivery rate at the nozzle regardless of viscosity of the lubricant or its temperature. Flow from the nozzle is controlled by a small globe valve which may be regulated by the operator. In this way time can be given for the lubricant in the differential to level off and overfilling is prevented.

Since lubricants satisfactory for the purpose have high viscosity at average garage temperature, it has been found highly desirable to install an immersion heater in the bottom of the oil tank. This heater is connected up several hours before the tank is to be used, so that a satisfactory temperature will be obtained to permit easy flow of the lubricant and rapid leveling in the differential, as well as to give a lower load on the pump motor. A thermostatic heat control has not been installed, although it might be used if desired.

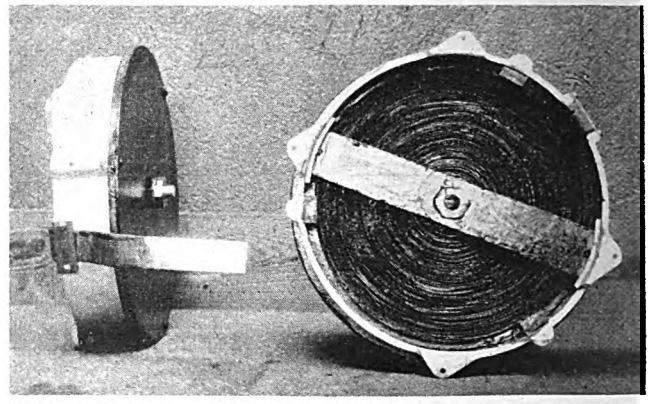
The initial investment and slight charge for power for the heater are more than offset by the quality and rapidity of the work done. A better job is done now with one man than it was previously possible with two.

Submitted in Electric Railway Journal Prize Contest.

Radio Interference from Cars Eliminated by Choke Coil

By A. S. Warner
Transmission and Distribution Department
Metropolitan Edison Company, Reading, Pa.

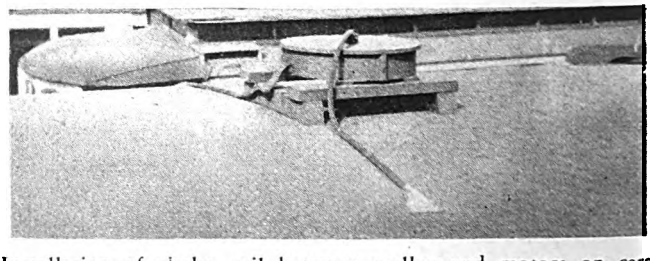
INTERFERENCE to radio reception caused by the commutation of motors on the cars of the Reading Transit Company, Reading, Pa., has been greatly reduced by the installation of a spiral wound choke coil between the trolley and the driving motors. The coil has 65



Choke coil is housed in an aluminum casting and held in position by a transite strip and three wedges

turns of No. 35 strap copper, and is housed in a circular aluminum casting having a ½-in. transite top from which the coil is hung by means of a center stud. Starting at the center stud, the coil is wound in a spiral with asbestos tape separating the turns. It is held in a fixed position in the aluminum housing by three maple wedges and by a 2½-in. transite strip. The coil is placed in the main bus line with the outside terminal connected to the trolley end and the terminal at the center stud to the motor end.

A filter arrangement, consisting of a choke coil and a condenser, would be more effective. The choke coil,



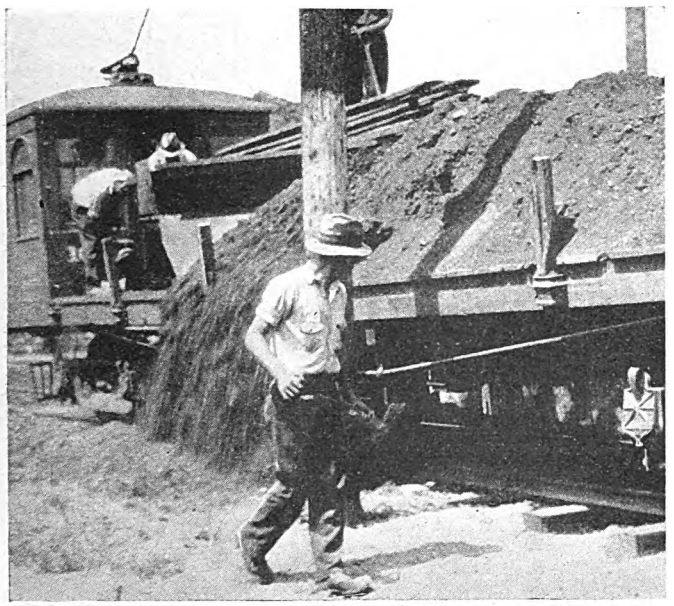
Installation of choke coil between trolley and motors on cars of Reading Transit Company has eliminated 95 per cent of radio interference

however, gave such satisfactory results that it was decided to use it alone. It was found to eliminate 95 per cent of the interference. The coil, moreover, is of rugged construction and requires very little maintenance. Approximately 115 cars have been equipped with this type of coil since 1928 without a single failure to date.

Digitized by Google

To supplement the effect of the choke coil, the field coil of the compressor motor was connected between the armature of the compressor and the trolley. This connection gives whatever benefit there may be in the choking action of the field coil against any interference originating at the compressor armature.

Work Car Equipped to Spread Material Along Track



Movement of plow along car floor spreads material along both sides of track

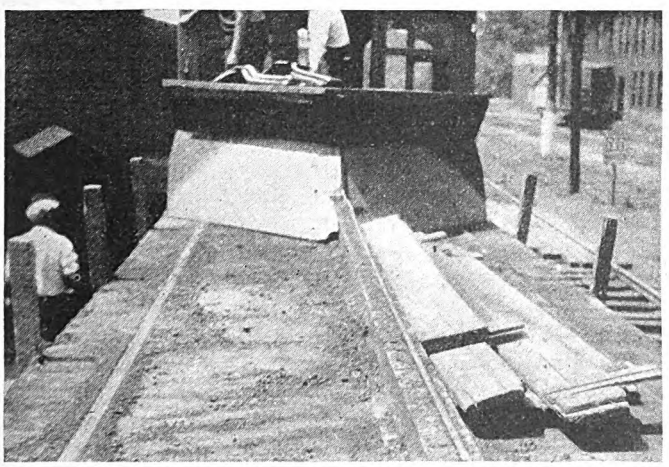
SPREADING of material along both sides of a track at the same time is accomplished with a work car built by the Stark Electric Railroad in its shops at Alliance, Ohio. An ordinary flat car is equipped with a plow, 4 ft. high, operating along a 12-in. I-beam which is placed along the center of the car floor. When the plow is moved forward, the material is spread along the sides at a rate determined by the speed of the plow and the speed of the car. The car is usually operated at 2 or 3 m.p.h. With planks placed along the sides, the car can be used for hauling and spreading ashes. With the planks removed, it can be used for hauling ties, poles and other similar material. When the plow is not in operation, it is placed near the control cab, leaving 42 ft. of clear car space for hauling material.

The auxiliary equipment for the operation of the plow consists of a 5-hp. motor, a steel drum, drum gears, and 100 ft. of steel cable. A wooden compartment, 30 in. high, 30 in. wide and 5 ft. long, incloses this auxiliary equipment. The wooden compartment is placed in the cab without interfering with the operation of the car. With the use of planks at the sides, about 20 cu.yd. of ashes can be loaded upon the car. The only manual labor necessary in unloading is for the removal of the side planks.

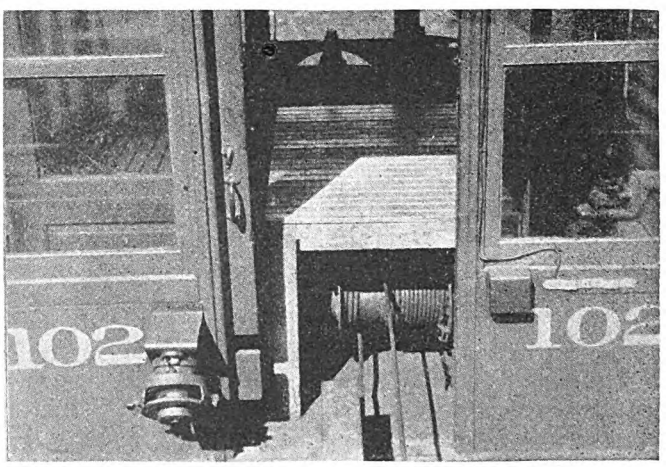
Remodeling Cars for One-Man Operation

CONVERSION of 65 front-entrance, center-exit, single-end cars for one-man operation is being carried out by the St. Louis Public Service Company. These cars, each with a seating capacity of 62, have been in service for about eight years as two-man cars. The brake valves formerly used on these cars are being replaced with a foot-operated self-lapping brake valve. The brake ratio based on the light weight of the car has been increased from about 100 per cent to 145 per cent. The operator is provided with a comfortable seat and is required to operate the car from a seated position at all times.

An emergency brake which is applied as a safety feature has been installed on each car and is intended to function only when the operator may not be alert and fails to hold it out of action. Electric heaters have replaced a stove heating system. The exit doors are operated by treadles and interlocked with the brakes in such manner that the brake is applied when the doors are opened and cannot be released by the operator until the doors are closed. The entrance doors are operated by air, but are not interlocked in any way with any other function of the car. Operation of cars on the rear end at slow speed is permitted with the back-up feature installed. Rattan seats have been faced around the edges with leather, and the seats themselves have been somewhat modified to make them more comfortable.



Steel cable pulls plow forward or backward along I-beam



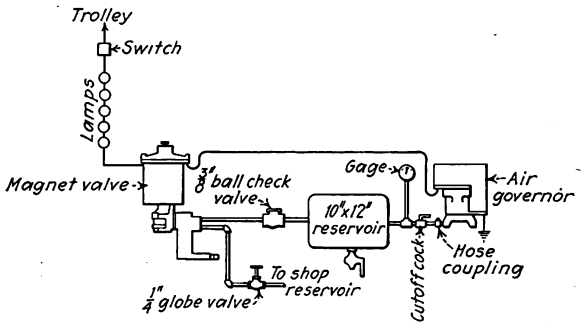
Auxiliary equipment is conveniently housed in the cab of work car

Digitized by Google

Testing Air Governors

By E. S. McGinnis
Foreman Electric Department
Dallas Railway & Terminal Company

AFTER overhauling governors it is often desirable to test them while they are off the cars. The Dallas Railway & Terminal Company makes this test by means of a simple arrangement, shown in the accompanying sketch, which consists of a $\frac{1}{4}$-in. globe valve, a $\frac{3}{8}$-in. ball check valve, a 110-volt magnet valve with suitable resistance, a 10x12-in. air reservoir, an air gage, a $\frac{1}{4}$-in. cut-off cock, and necessary $\frac{1}{4}$-in. piping and fittings. Air pressure is obtained from a reservoir in the shop.



Arrangement used by the Dallas Railway & Terminal Company for testing air governors after having been overhauled

The governor to be tested is connected to the reservoir by means of a suitable hose coupling and wired to the magnet valve through one terminal and grounded through the other. To begin the test, the main switch is closed. The governor, being in the minimum pressure position, closes the switch in the magnet valve circuit and causes that valve to open. Air is then allowed to flow through the ball check valve to the reservoir and governor. When the pressure reaches the maximum value, the electric contact in the governor is broken and the magnet valve closes. Back pressure from the reservoir causes the ball check to seat at this point. Pressure in the reservoir and governor is gradually reduced by allowing air to leak off to atmosphere through a $\frac{1}{64}$-in. hole drilled in the wall of the check valve. The air leakage passes from this hole to the exhaust port of the magnet valve. When the pressure in the governor again reaches the minimum value, the electric contact is closed and the operation is repeated.

Insulating Paste for Bolt Heads*

By E. V. Lackey
Armature Room Foreman
Ottawa Electric Railway

MANY of the automatic circuit breakers in use on cars of the Ottawa Electric Railway have been damaged by an arc, which occurred with a heavy overload, jumping to an unprotected bolt head. This short circuited the terminals through the frame and often burned out the overload coil. These bolt heads are difficult to cover by ordinary means, but a method of applying paste was developed which accomplished the desired result. This paste, consisting of powdered asbestos and shellac, was applied over the exposed metal parts. The paste was then heated by a flame until enough alcohol was evaporated to allow a crust to be formed. In a few hours the whole body of the paste was hard and formed an excellent fireproof protective covering. This method has been so successful in preventing the former trouble that it is now used on all rebuilt and repaired circuit breakers.

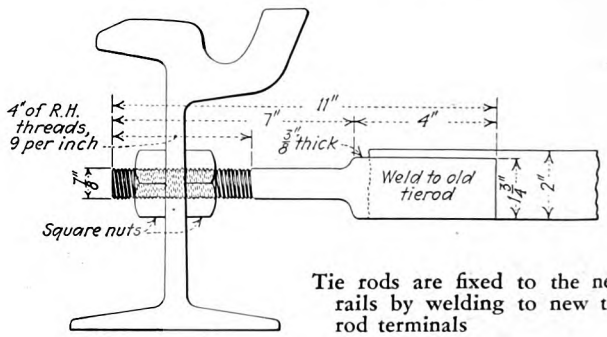
Submitted in Electric Railway Journal Prize Contest.

Economical Rerailing at Atlanta*

By D. S. Berman
Roadway Department Georgia Power Company
Atlanta, Ga.

DIGGING up less paving when laying new rails has been accomplished by the roadway department of the Georgia Power Company, Atlanta, Ga., by a new method recently adopted. It was desired to lay new rails in a street which was to be repaved by the municipality. The track foundation, of creosoted ties and grouted ballast, was in satisfactory condition and capable of lasting a number of years more. With the purpose of saving

Atlanta reduced paving cost by laying new rails on the old track foundation



Tie rods are fixed to the new rails by welding to new tie-rod terminals

labor and part of the paving, the new rails were laid by digging a 1-ft. wide trench on each side of the rail to the top of the ties, a section of paving about 2½ ft. wide remaining undisturbed along the center of the track. To pull up the old rails, it was necessary to cut the tie-rods. This was accomplished by burning them with a carbon arc about 7 in. from the rail. The relay rail was then laid in the trench and spiked to the ties. The old tierods were fixed to the new rail by welding one end of a new tierod terminal, 11 in. long, to the old tierod, and bolting the other end to the rail.

Digitized by Google

NEW PRODUCTS
for the Railways' Use

New Standardized, Light Weight Car Announced

INCORPORATED in the design of the new standard production model car, just announced by the recently organized General Car & Coach Corporation, are several features intended to lower first cost, operating and maintenance costs, increase speed, reduce noise and improve appearance. These objectives are to be attained principally by trucks equipped with worm drive and a new type of braking mechanism, and a carefully proportioned, lightweight body.

The car, which is equipped with two trucks and intended for city service, can be made either for single-end or double-end operation. In the former design seats will be provided for 52 passengers, and in the latter for 45 passengers. The estimated weight for the single-end car equipped with four motors, is 24,000 lb. For double-end it is 25,000 lb. Principal dimensions of the car are given in an accompanying table.

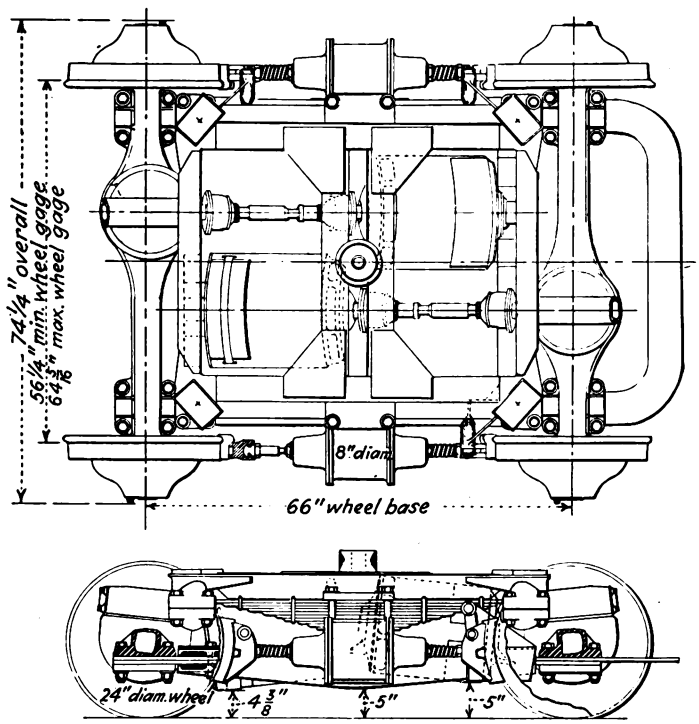
Although the weight of the car is only 24,000 lb. it has been so designed as to have adequate strength. The underframe and most of the body parts are to be of steel. Wheel guards are to be mounted on the truck to prevent wash on the underframe, an important factor in prolonging the life of the car. Particular attention has been paid to getting a low, racy appearance. A plain arch roof which extends on the sides to the windows, eliminating the letterboard, full streamline effect, wide windows, and a bumper on each end aid in giving this appearance. A double front door and a single rear door allow the use of the circulating load principle.

An unusual combination is service braking by foot and control by hand. Another feature is a hand brake for emergency use, similar to the type used in automobiles. Either Westinghouse or General Electric electrical equipment can be furnished.

Distinctive points in the design of the trucks are side mounted brake cylinders for actuating brake shoes, propeller unit disks for emergency braking, fully housed worm drive axles, rubber insulation of metal parts, four corner bearing plates, an axle aligner and wheel guards.

In the new braking system adopted, practically all brake rigging is eliminated. As may be seen in the drawing of the truck, a cylinder is mounted on each side to receive applications of air when it is desired to stop the car. Forcing a piston in each direction from the center, the conventional brake shoes are pressed against the wheels simultaneously. Aside from the elimination of conventional rigging, with its attendant noise, weight and necessity for frequent inspection, an advantage claimed for this system is that it can be inspected easily from the outside of the car and adjusted with the use of only two wrenches. The cylinders are connected to the air piping on the underframe by flexible tubing. As mentioned previously the air brakes are controlled by a pedal.

Supplementing the air brake is an emergency brake, which uses a disk, mounted on the propeller unit, and a handle similar to that used in automobiles for the operator to bring the shoes against this disk.



Details of the new truck, showing the brake cylinders and shoes, four bearing plates, stiffening bar and worm drive axle

Timken worm-drive axles, with each drive shaft mounted over the main axle, are to be used. The axles are to be inclosed with a single piece housing. No differential is used. Journal bearings are to be lubricated by Alemite fittings. The two motors for each truck are to be mounted on the cross members of the frame, giving full spring suspension for their weight.

Noise is to be reduced to a minimum by the elimination of all metallic connections, with the exception of the motor leads to the body. The springs are supported in rubber, as well as all other frame members. An innovation is the use of a graphite bronze bearing plate at each of the four corners of the frame. An important member of the truck frame is a U-shaped bar which passes underneath the two axles and extends around one of the ends. It is designed to keep the axles in perfect alignment.

Arrangements for the manufacture of this vehicle have been made with the St. Louis Car Company, St. Louis, Mo. Sales headquarters of the new company are at 100 State Street, Albany, N. Y.

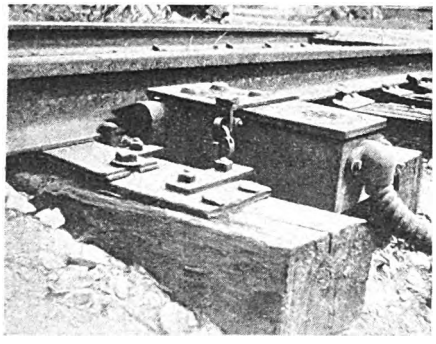
Principal Dimensions

Length over buffers	40 ft. 1⅞ in.
Length over door posts	28 ft. 6 in.
Width at belt rail	8 ft. 3 in.
Height, rail to roof	9 ft. 8¾ in.
Height, floor to headlining	7 ft. 2 in.
Height, rail to first step	15 in.
Height, step to floor	13 in.
Post centers	47 in.
Seat spacing	30 in.
Wheelbase of truck	5 ft. 6 in.
Pivot centers of trucks	19 ft. 7 in.
Diameter of wheels	24 in.

Digitized by Google

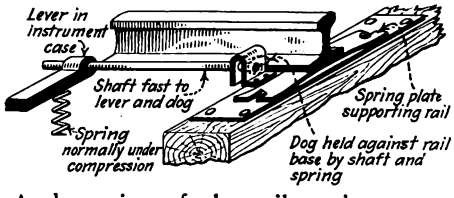
Highway Crossing Signals Controlled by Mechanical Rail Contactors

INCREASING interest is being shown by interurban electric railways in mechanical signal control. Several steam railroads have recently replaced track circuits by rail contactors in automatic signal territory to avoid cutting into the signal track circuits. With the track circuit type of control it is often necessary to rearrange two or three signal circuits or to install additional ones in order to secure proper operation of one



Mechanical rail contactor for controlling highway crossing signals, actuated by the downward movement of a spring supported rail

highway crossing signal. With a rail contactor known as the "Fusticlo," manufactured by the Louisville Frog, Switch & Signal Company, of Louisville, Ky., the control circuit is entirely independent of the track circuits. The Illinois Terminal System and the Northern Ohio Interurban Company are among those using this rail contactor.



A depression of the rail resting on a spring plate causes a turning of the dog held against the rail base, thus producing rotation of the shaft which actuates the contacts

A spring plate is placed between the rail base and tie, raising the rail about ⅜ in. Spikes are lifted about the same amount on the two ties each side of the tie bearing the spring plate, so that the hump in the rail spreads over five ties. A dog rests on the top of the rail base at point where the spring plate is located. This dog is securely fastened to one end of a shaft which has a lever fastened to its other end. A spring, normally under compression, is placed under the lever. The dog is thus forced against the rail base by the compression spring. This compression spring, however, is not of sufficient size to effect the deflection of the rail in the least. The other end of the lever engages the mechanism which operates a circuit breaker.

In operation, a train approaching the point where the spring plate is located depresses the rail and flattens the spring plate. When the rail is depressed the dog on the base of the rail follows the rail downward, due to the action of the compression spring, turning the shaft and moving the end of the lever which engages the mechanism upward.

There are two types of rail contactors in use at present, directional and non-directional. Directional instruments are commonly used as starters on single track. They are so arranged that contacts which are actuated by a train going in one direction will not be operated by a train moving in the opposite direction. In some special cases two sets of contacts are used in a directional instrument, in which case, one set operates for a train moving in one direction, while the other set will operate for a train moving in the reverse direction.

Non-directional instruments are used chiefly as stopping or cut-out instruments and also for starters on double track where no reverse movements occur. They have contacts which are operated by trains moving in either direction. The principle of operation is the same as the directional type, except that no selective device is employed.

Light-Weight Bus Body Introduced for Ford Chassis

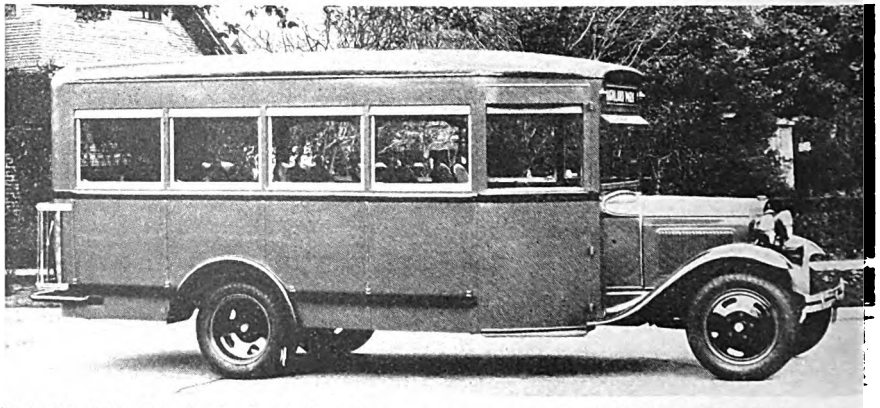
MEETING the demand for a moderately priced light-weight bus body to be mounted on the Ford Model AA 157-in. chassis, the Fitzjohn Manufacturing Company, Muskegon, Mich., offers a 21-passenger body in street car and parlor coach styles. The manufacturer states that it combines the feature of light weight with comfortable seating arrangement, ample headroom and aisle space.

Principal dimensions of the body are: belt length, 196 in.; belt width, 86 in.; headroom, 70 in.

The body weight has been held within the allowance necessary for mounting on the Ford chassis by the adoption of special body framing and lightweight metal bracing. It is claimed that the parlor coach body, completely equipped, weighs not more than 2,500 lb. Specially designed Ypsilanti Reed Furniture Company seats provide the necessary comfort and knee room.

Parlor coach body is equipped with inside baggage lofts for intercity operation

Attention is directed by the manufacturer to the fact that the cowl and dash assembly, being the type regularly furnished on Ford chassis, makes possible the mounting of these bodies at any point in the country.



This Fitzjohn bus body is designed for mounting on Ford Model AA 157-in. chassis

Digitized by Google

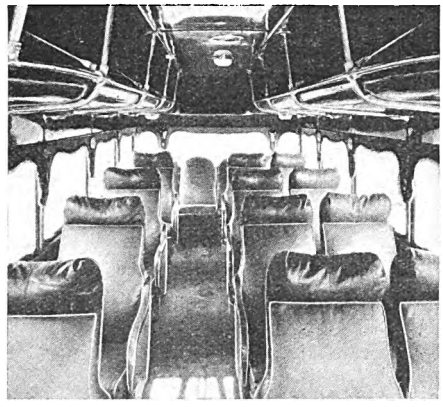
The framework is of seasoned ash and maple. New "Galvaneel" steel window sash by O. M. Edwards Company, and one-piece plate glass hinged windshield have been adopted. The entire rear end of the body, including the top roof corners, is of metal. Appearance is enhanced by a military front with a cadet visor and by the use of window eaves around the side windows. The parlor coach body is also fitted with ornamental grille window valances, and a Hunter roll sign together with a rear drum sign.

The interior is trimmed with textile ceiling and lacquered Masonite panels. Linoleum floor covering and Diamondette safety tread for entrance steps have been adopted. A spare tire is located on the left front side of the body. The rear bumper is of tubular steel and the side bumpers are of single bar cold-drawn steel. Accessories include a rear-view mirror and an automatic vacuum windshield wiper.

Additions in the Field of Low-Capacity Buses

TWO six-cylinder buses, a 16-21-passenger pay-enter city type and a sixteen-passenger interurban type, have been added to the line of the White Company. These buses are mounted on the Model 613 bus chassis and are designed for service where economical operation and flexibility in traffic are of major importance. Both have Bender bodies.

The interurban type has sixteen fully upholstered parlor car type seats of lightweight construction. The seats are liberally spaced and are equipped with concave head rests and hat clips on the back. Over each seat is a small dome light, eight in all, mounted under the baggage rack.



Comfortable and attractive interior of new White intercity bus

The seating arrangement provides for a row of single seats on the right side of the aisle facing forward and a row of two-passenger seats on the left side. A lightweight aluminum grille work, with a small target sign, incloses the two spare tires mounted in the rear. Space is provided above the rear roof of the body for handling excess baggage; interior racks may be used for hand baggage. The upper part of the pull-up windows is trimmed with a valance which extends down on each window post to the top of metal-framed mirrors. The heater is of the hot water type placed to the right of the dash. Four roof ventilators are arranged so as to provide an adequate supply of fresh air. General illumination is obtained from four large dome fixtures which are mounted in the roof.

General specifications are as follows:

Wheelbase, 180 in.
Net weight, approximate, 9,800 lb.
Length over-all, including bumpers, 24 ft. 8 in.
Dash to end of body, 18 ft. 7 in.
Center of rear axle to end of body, 72⅝ in.
Outside width, 78 in.
Headroom, at front, 72 in.
Headroom, over rear axle, 68 in.
Seat centers, 33 to 37 in.

Economy of operation and long life are the claims made by the manufacturer for the pay-enter body. The weight of this body has been held to a minimum. A generous seating space of 33 in. affords the comfortable room usually found in a de luxe type bus. Interior width is 84 in., using double seats measuring 34 in. with an aisle space of 16 in. An attempt has been made to eliminate the crowding effect of the small type bus by providing a headroom measuring 76 in. at the front door. This is made possible without undue over-all ıeight by a double drop-frame feature.

The 4-A engine used in the Model 613 is a six-cylinder "L" head type, 33¾-in. bore and 4½-in. stroke, with clutch and transmission mounted as a unit. It has a rigid crankshaft, mounted in seven main bearings, and a detachable head with machined combustion chambers. This engine delivers a torque of 175 ft. lb. at 1,000 r.p.m. Full pressure lubrication is supplied to all main connecting rods, camshaft, piston pin, accessory drive and chain idler bearings. The clutch is the White single-plate type operating in oil. All transmission gears are of chrome nickel, steel-carbonized and heat-treated. The rear axle is a one-piece steel casting with a single reduction of the semi-floating type. Brakes are the four-wheel internal-expanding type with molded lining, operated hydraulically with vacuum booster. Standard equipment includes 7.50-20 balloon tires, single front and dual rear.

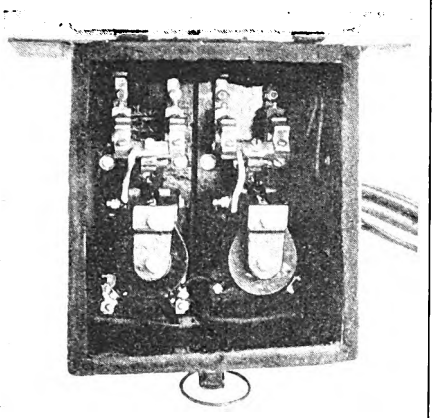
New pay-enter bus for city service developed by the White Company

Compact Field Shunting Switch

COMBINING the functions of two ordinary switches for shunting the fields of a pair of series railway motors, a lightweight switch, Type UM-22, with a novel arrangement of contacts, has been brought out by the Westinghouse Electric & Manufacturing Company.

As most railway motors are connected in parallel pairs, two switches for a pair of motors would always be connected together on one side. It is unnecessary, therefore, to bring out four leads, making possible a double-pole switch in which the moving contacts are not insulated from each other, and which has two incoming leads and a single outgoing lead. Since an important factor limiting the width of a conventional double-pole switch is the spacing between moving contacts for insulation, a switch can thus be made extremely narrow with

Digitized by Google



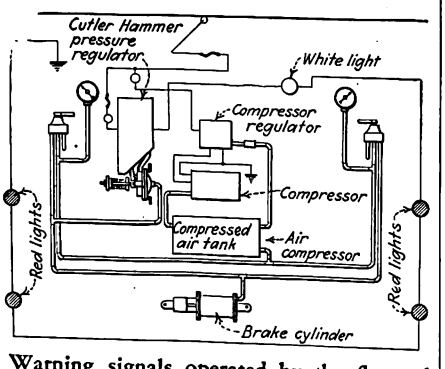
This contactor box contains two switches for four-motor equipments. Narrow spacing of moving contacts makes possible a reduction in weight

the two moving contacts mechanically and electrically interconnected. Equalization of contact pressure between pairs of contacts is obtained by the use of resilient stationary contacts and the usual spring in the moving mechanism.

One switch suffices for two-motor equipments and two switches for four-motor equipments up to 60-hp. rating. The switches and current limit relay, which controls them, are each inclosed in a sheet metal box for under-car mounting. For four-motor equipments, the Type UM-22-A field shunting contactor box, weighing about 45 lb., the Type TS-27 current limit relay box, weighing about 30 lb., and the Type M field shunting resistor, weighing 18 lb., are recommended by the manufacturer. Field shunting equipment for two-motor equipments weighs 25 per cent less.

Signal Lights for Car Stop Warning

AUTOMATIC operation of a safety signal system to warn pedestrians and motorists that a car is about to stop has been developed by Ashley Hale, West Groton, Mass. The danger signals are displayed at the front and rear end of the car whenever any appreciable amount of air is admitted into the brake cylinder.



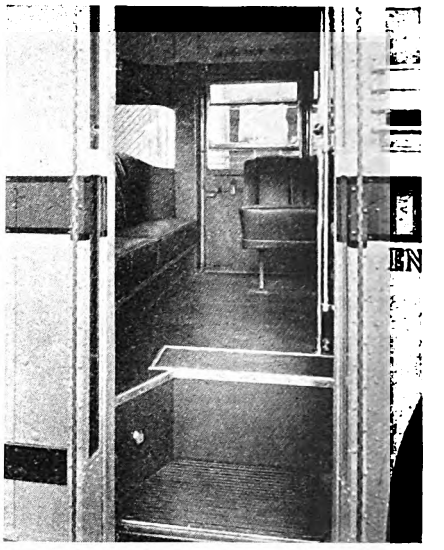
Warning signals operated by the flow of compressed air through the brake control

Operation is controlled by means of a Cutler-Hammer pressure regulator, Type C, which is incorporated into the braking system, as shown in the illustration. It is connected to the cylinder pipe so that, when air is admitted under pressure in any quantity to the brake cylinder, it will also be admitted to the pressure regulator. The lights are placed in series and are in circuit with the regulator which is fed directly from the trolley through a fuse and a switch. A clear lamp is placed inside the car and two pairs of red stop-indicating lamps are located on the dashers.

Rugged Thermostat Designed For Close Heat Control

RELIABILITY, rugged construction, neat appearance with no exposed screws, adjustments or openings in the cover to invite tampering by meddlers, are the advantages claimed for the heat-control instrument known as the No. 690 Arcostat, which has been designed by the American Radiator Company primarily for use on electrically heated street cars and buses. The instrument is finished in black enamel with Bakelite base, and has a snap-action contact by means of a permanent magnet. It is said to be unaffected by vibration, rolling or stopping of the car.

The differential of the instrument itself is $\frac{1}{5}$ of 1 deg. The actual differential obtainable on air temperature will depend upon the rapidity of air movement over the instrument, and the rapidity of temperature change. The more rapid the air movement and the slower the temperature change, the closer will be the control. However, the actual operating differential under any specific set of conditions can be determined only by a test. All adjustments are made at the back after removing the cover by means of a special screwdriver. The instrument is fixed to the wall by screws with heads, requiring a special wrench or key. There is no opening in the cover. Due to the use of a liquid-charged bellows element, this instrument will continue indefinitely to operate at the degree set.



Mats can be placed in step-wells and above step, being held securely in place with special molding strips

Tread Flooring for Safety and Cleanliness

UNDER the trade name of "Safety Treads," a novel type of flooring with grooved construction is marketed by the Melflex Products Company, of Akron, Ohio. It is claimed that this type of flooring prevents slipping by gripping the soles of shoes and that the grooves collect the moisture, sand and dirt to eliminate the excessively fast wear that would result if the gritty dirt were collected and ground into the treads.

The flooring is made from strong cotton cords embedded in a rubber compound, vulcanized and cut into strips. Each strip is then dipped in a special rubber cement and molded onto a tough rubber base. The strips in the tread are separated by grooves approximately $\frac{3}{8}$ in. wide.

This material is now in use on the cars of the Youngstown Municipal Railway and the trolley buses of the Department of Street Railways, Detroit.

Safety treads installed in the aisle of a Birney safety car

Digitized by Google

NEWS *of the Industry*

LATE NEWS

Dayton, Ohio.—The Cincinnati & Lake Erie Railroad, which connects Cincinnati, Dayton, Springfield, Columbus and Toledo, made a material cut in rates over the Thanksgiving holidays. The round-trip fare between any two of these places was the cost of a one-way ticket plus 10 cents.

✦

Boston, Mass.—The ninth annual educational program for the employees of the Boston Elevated Railway, just begun, will continue through March of next year. It will consist of sixteen courses and a series of forum meetings with prominent speakers. Last year more than 400 received certificates for successful completion of courses.

✦

Fort Wayne, Ind.—Robert M. Feustel, executive vice-president of the Midland United Company and chief operating head of the Insull utility group in Indiana, has been appointed chairman of the public utility division of Governor Leslie's state unemployment commission. At the preliminary conference of the commission called by the governor Mr. Feustel stated that efforts would be made to start the construction program by Jan. 1 instead of in the spring as originally planned.

✦

Chicago, Ill.—Officials of the Chicago Rapid Transit Company and associated transportation companies have received many commendations as the result of the service of a first aid and medical department at two recent large gatherings near Chicago. One gathering was at the National Air Races and the other at the state convention of the American Legion in Aurora, Ill. In each instance the Rapid Transit first-aid unit was the official medical organization of the event.

✦

Birmingham, Ala.—Control of the Alabama Bus Company and the Capital Coaches, Inc., has been purchased by the Consolidated Coach Company, Lexington, Ky. Mileage covered by the Consolidated will be 5,000 miles, operating 350 modern motor coaches. Birmingham will be on a through line from Mobile to Cincinnati and Washington. The new officers of the Consolidated company are: L. B. Herrington, president; J. P. Pope and Guy A. Huguelet, vice-president; A. A. Tuttie, secretary-treasurer. Messrs. Herrington and Pope are officers of the Kentucky Traction & Terminal Company.

✦

Rochester, N. Y.—The Public Service Commission has authorized the receivers of the New York State Railways to substitute buses for trolleys on its Laurelton-Browncroft route, here, and the town of Irondequoit. The fare to be charged is the regular 10-cent city fare to the city line and 5 cents from the city line to the terminus in Irondequoit, making the through fare 15 cents. City fares entitle riders to transfer privileges.

(*Late News Continued on Page 772*)

Rapid Transit Proposal Made at Montreal

Immediate Building of Eight-Mile Subway to Cost $65,000,000 Made on Behalf of Tramway in Plan Outlined by R. N. Watt

EMPHASIZING that steps should be taken immediately to meet the growing problem of traffic congestion and laying stress upon the fact that rapid transit is now recognized as a first fundamental in the growth of a city, R. N. Watt, assistant to the president of the Montreal Tramways, addressing members of the Rotary Club of Montreal on Nov. 18 brought to the fore the city's great need of subways as a solution to traffic and transportation problems. He submitted the following definite proposal:

1. The building of a subway of 8 miles, to be completed by 1936, with the following component parts:

(a) A north-south subway, running from Craig Street terminal to Laurier Avenue, with approaches from the latter station providing transfer under cover from the subway station to the car line—a distance of 2.35 miles. This would be located somewhere between Bleury and St. Lawrence Streets.

(b) The erection of an east-west subway, running from Atwater Avenue to Parthenais Street—a distance of 4.13 miles, located between Sherbrooke and Dorchester Street.

(c) A connection from the Craig Street terminal to the east-west line near Stanley Street, with a station at Dominion Square so designed as to give direct access to the C.N.R. and C.P.R. station—a distance of 1.40 miles.

2. The expenditure of approximately $65,000,000.

3. Certain minor modifications of the present contract between the company and the city of Montreal, which would permit the company to build and operate subways and, at the same time, protect the present investments of the company so that its financial position will not be adversely affected.

4. The guarantee of the bonds issued both as to principal and interest by the city.

5. A universal fare with universal transfer of seven tickets for 50 cents within the uniform territory.

6. Immediate action by the city authorities by which the above suggestions can be legally carried out and approved, and application to the Quebec Legislature to give authorization.

Mayor Houde, thanked the speaker. In his opinion the speech was the "best address I have ever heard on civic matters,

(*Continued on Page 774*)

The Business Outlook

BUSINESS shows more definite signs of having hit that hard-pan resistance level which in the past it has always encountered at about 20 per cent below normal. At this point apparently the fundamental human wants begin to reassert themselves. Basic industrial activity is still declining, but general trade has begun to expand at more than the seasonal rate. Money turnover is rising, commercial loans are expanding, currency in circulation is increasing with seasonal retail trade demand. As the automobile industry prepares to play its card courageously on next year's market, employment is being given some stimulus. Key commodity prices are firmer as resistance to further deflation grows. Bears in Wall Street and elsewhere apparently are beginning to look for winter quarters.

—*The Business Week.*

Economic Advantage Lies With Use of Electricity

Placing progress in transportation at the base of all industrial progress, Charles Gordon, managing director American Electric Railway Association, in an address before the southern district meeting A.I.E.E. at Louisville, Ky., on Nov. 19 showed how the dominating importance of the electric railway industry had stimulated the development of electric power, and pointed out the further opportunities of the electrical engineer in city planning.

Mr. Gordon traced the development of steam as power for railroad use and the early application of electric power to the problems of urban transportation. He showed how automotive power, coming into general use in the automobile, has made inroads into all phases of transportation, and how it has created a tendency in the minds of automotive enthusiasts to relegate electric urban transportation to the scrap heap. He said:

It seems particularly timely, that electrical engineers examine a little more closely than is usually done, the field of transportation in urban areas where the great electrical industry had its origin barely more than fifty years ago and where, in turn, it is already freely predicted that it is to be replaced by automotive power. In this examination we shall need to concern ourselves as much with economics as with engineering, for it is on the scale of economics that the achievement of engineers are finally weighed and finally judged.

With factual observations, Mr. Gordon spoke on the economics of the utilization of street space, showing how all forms of electric transportation were far more efficient than any means of service yet developed with automotive power. Mr. Gordon concluded:

It seems hardly conceivable that the enormous economic advantage of collective transportation by electric power will not be applied on a much larger scale in the future than at present, for the solution of the growing problem of traffic congestion in cities. It is true that a much higher standard of convenience and comfort for collective transit facilities is necessary. But compare it to the cost to the community of rebuilding our cities for automobile travel—the economic advantage is all with the electric power in the high traveled density of urban areas.

Digitized by Google

LATE NEWS

(*Continued from Page 771*)

New York, N. Y.—The city has been asked to make official study and report of suspended monorail system of transportation as a means of extending rapid transit relief to outlying districts in a resolution adopted by the Queens Planning Commission. The action follows an investigation of suspended monorail construction and costs, operation and safety features by traffic and transit committee of planning group.

✦

Toledo, Ohio—The Summit-Broadway line of the Community Traction Company, has been shortened by nearly three-quarters of a mile and the old Casino, once a popular amusement center of the railway on Maumee Bay, has passed out of existence as a transfer point, due to establishment of a new wye at LaSalle and Summit Streets as a meeting place for company cars and the Point Place bus line. A passenger station is being built by the company at that point.

✦

Newark, N. J.—According to Barron's, the loss sustained by the transportation division of the Public Service Corporation thus far this year practically offsets gains made by electric and gas departments, so that the earnings of the combined system are running at a rate approximately the same as in 1929.

✦

Kansas City, Mo.—The city has filed protest against an order of the Missouri Public Service Commission which authorized the Kansas City Public Service Company to increase weekly permits to 40 cents. The protest stated that the city had no opportunity to oppose granting of the new rate, which is an increase of 5 cents over previous fare basis. The cash fare is 10 cents. Holders display their permits and pay 5 cents additional for a ride.

✦

Milwaukee, Wis. — During the next several years large additional generating capacity for the territory served by the Milwaukee Electric Railway & Light Company will be made available with the building of the new $25,000,000 steam-electric generating plant at Port Washington. A federal permit has been granted for the necessary harbor improvements, and engineering work is being completed so that construction may proceed as quickly as possible. It is planned to have the Port Washington plant's first unit of 80,000 kw. capacity ready for operation during the latter part of 1932.

✦

New York, N. Y.—The Transit Commission called recently for public hearings to determine whether the Jamaica Central Railway, the New York Railways and the Second Avenue Railroad should continue one-man cars. The commission a year ago authorized their use of one-man cars if certain safety devices were installed. It is alleged that the companies failed to carry out this proviso. The commission has set Dec. 10 for consideration of the operation of one-man cars on the Graham Avenue line of the Brooklyn-Queens Transit Corporation.

Indianapolis, Ind.—Operating revenue of the former Union Traction Company for 1929 was $2,690,341, according to a report filed with the Madison Circuit Court by Receiver Brady. Gross income after deduction of operating expenses, taxes, etc., was $231,762. Total revenue from bus operations during the year amounted to $136,316 and expenses, $210,640. Last July the Union Traction Company was purchased by the Midland United Company and was succeeded on Aug. 1 by the Indiana Railroad. It is now being operated under centralized supervisory management in conjunction with the interurbans of the Interstate Public Service Company, Indiana Service Corporation and other subsidiaries of the Midland United Company.

✦

Salt Lake City, Utah—E. A. West, general manager Utah Light & Traction Company, speaking on the topic "Mass Transportation," told members of the engineering council that present conditions make railway extensions economically impossible unless railway companies are granted relief. He added that higher fares would not entirely solve the problem, and contended that the present paving tax should be eliminated. He said that the company, under present arrangement, is charged for pavement which causes an immediate decrease in its own business.

✦

Wellsville, Ohio—Discussion of terms of a new franchise for the Steubenville, East Liverpool & Beaver Valley Traction Company will take place here soon before R. H. Keay, chairman of the Council's franchise committee. The company's franchise expired on Sept. 19. Operations have been continued, pending arrangements for a new grant. In East Liverpool, a new grant is sought to replace the franchise which expired on Oct. 19. The company has asked continuance of the 7-cent city fare there, but wants the right to substitute buses for cars on a number of routes.

✦

Detroit, Mich.—The operating costs ot the Detroit Municipal Railway were reduced $40,000 when the street railways commission decided to eliminate this sum from the funds regularly appropriated for the operation of private automobiles by employees of the system. Most of the cars owned privately but operated at public expense, are attached to the claims division.

✦

St. Louis, Mo.—The Missouri Public Service Commission has overruled a motion of the St. Louis Public Service Company for a rehearing on its petition for a permit to operate a bus line from Wellston, Mo., to the Overland Park district in St. Louis County. While the commission denied the company a rehearing, it pointed out that it would have no jurisdiction if the Public Service Company can obtain the necessary local consent for the line. Several sections of the Missouri Motor Bus Act appear to be in conflict, but to date the Missouri courts have not interpreted the various sections of the act. Pending a final decision, the commission has avoided assuming jurisdiction over bus lines as part of an urban system.

✦

New York, N. Y. — Samuel Untermyer, special counsel for the city in rapid transit negotiations, denies that there has been an agreement as to the price to be paid by the city for the rapid transit lines in a unification plan. Mr. Untermyer, in his statement, said: "The negotiations are, in point of fact, further from consummation than they have been in many months."

✦

Fonda, N. Y. — The recently devised plan of the New York Central Railroad to use the properties of the Fonda, Johnstown & Gloversville Railroad, in order that its unification proposals might conform to the demands of the Interstate Commerce Commission, has been approved by the commission. The agreement provides for readjustment of the rate structure prevailing on the interchange of freight traffic and a contract for the use of joint facilities at Fonda. Much difficulty was encountered during the consideration of separating the Fonda's steam from its electric properties under the commission's original order. Under the present agreement, the separation is unnecessary and the Fonda retains its independent status. The two roads believe that the new rate agreed upon will be beneficial to shippers.

✦

Louisville, Ky.—Recommendations for reductions in wages paid to officers and employees of the Louisville Railway are made in a report to the directors by a special committee of that body.

✦

New York, N. Y.—A monthly magazine, *Traffic Regulation*, devoted to street and highway traffic problems, edited by William Gruen with offices at 114 East 32d Street, has been established as a medium of exchange of discussions of traffic problems.

✦

Washington, D. C.—In order to prevent traffic congestion caused by the parking of interstate buses in downtown Washington, the Public Utilities Commission and the Commissioners of the District of Columbia have embarked on a program to force the bus lines to construct one or more union bus terminals. According to present plans, the police powers of the city will be invoked to route the bus lines through less congested areas. Thus it is believed that the bus lines will be induced to construct terminals and waiting rooms.

News Flashes for the Industry

TO SUPPLEMENT the service of the regular monthly issues of ELECTRIC RAILWAY JOURNAL, a separate NEWS service appears on 39 Saturdays during the year. This supplement keeps you in touch with fare increases, court decisions, association meetings, financial and corporate news, equipment purchases, changes in personnel.

Read the

Electric Railway Journal

NEWS!

Digitized by Google

Profitable Meeting Is Held by Iowa Operators

Concentrating on the problems among the most important for the industry to solve, the Operators' Section of the Iowa Electric Railway Association, 100 strong, in convention at Des Moines on Oct. 29 and 30, spent a valuable period. Among subjects discussed were fare collection, operating and maintenance problems, better service and its sale, the trolley bus, railway lubrication, stores accounting, improved transportation units, and bus operating costs. As an innovation, each manufacturer representative was allotted five minutes to express his ideas on "how to do the job better."

Frank V. Skelly, of the Des Moines Railway, chairman of the executive committee of the section, introduced Mayor Crouch who characterized the convention as a commendable co-operative endeavor in the advancement of the science of transportation. Kirk J. Keith, Des Moines Railway, then presided as chairman.

John F. Ohmer, Ohmer Fare Register Company, showed how the selling problem for the railways had changed, and emphasized the need for extensive analysis, research and experimentation. He analyzed the cost of operating taxicabs, buses, private automobiles and street cars, and pointed out that advertising should stress the economy of the street car ride more than other objectives. Mr. Ohmer said the zone fare system permitted transportation to be sold at an attractive price to people who wish to travel short distances. He recited results obtained in Cleveland.

In developing the unusual subject "Stumps in the Field," Henry Cordell, Chicago, North Shore & Milwaukee Railroad, told of ways and means of solving major problems which confront operating men. Among the "stumps" mentioned were pessimistic employees, neglected painting, deferred repairs, slow schedules, inadequate lubrication of journals, babbitts with faulty bases, poor contacts in electrical circuits, leaky slide valves in air-brake systems, improper center plate lubrication, insufficient wheel and axle inspection, unattractive equipment, troublesome water supply for hot water heaters, and unsatisfactory current collection. He stressed advantages of using the sliding collector and polishing the trolley wire.

Laurence Wingerter, Des Moines Railway, told of the problems and difficulties of his company in the past and related the accomplishments by the new management, including complete conversion from two-man to one-man operation, the purchase of 50 new cars, remodeling of 101 old cars for one-man operation, speeding up schedules, improving the power system, effecting major economies, adopting new trainmen's uniforms, installation of a new transfer system and establishment of a new publicity department. Mr. Wingerter told of the many efforts to merchandise the service and to improve public relations.

W. J. Clardy, Westinghouse Electric & Manufacturing Company, discussed the trolley bus comprehensively from the important standpoints of application, performance, maintenance, operating costs and advantages, supplementing his analyses with facts and data on the Chicago, Salt Lake City and Detroit installations. He also compared in detail figures of the street car, trolley bus and gasoline bus for both light and heavy traffic.

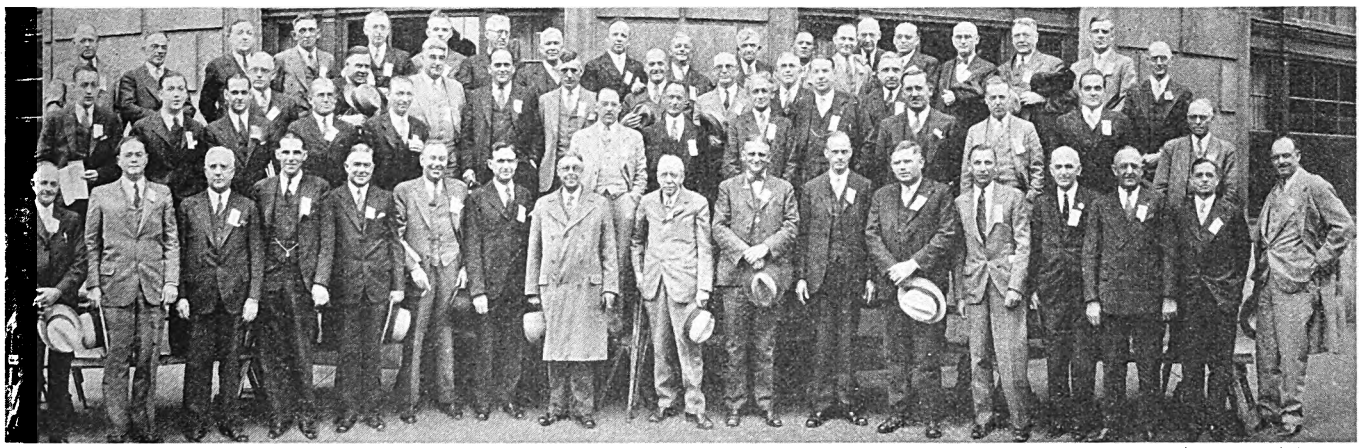
R. S. Neal, Texas Company, said developments in the lubrication of motors, journal boxes and bearings had aided materially in reducing car maintenance costs. Objectives sought are reduction of power consumption, maximum economy of oil, elimination of time and expense for waste saturation and reduction of shop work on bearings and journals. One of the main problems, he pointed out, is to maintain an oil film between bearing surfaces, changing solid friction to fluid friction, and to do this with an oil in which the internal friction of the oil itself can be kept down. Mr. Neal told of the tests made in Baltimore with oil seals and low-viscosity oils, and reported the satisfactory results obtained.

During the past fifteen months, the Des Moines Railway decreased its stores account approximately 27 per cent, employees 50 per cent, and wages 41 per cent, according to G. H. Brown, purchasing agent of the company, in his paper on "Stores Accounting." Although these savings have been accomplished mainly by the adoption of the four to five turnover per year plan on all articles excepting emergency stocks, several other factors have entered. Complete and accurate records must be kept, materials must be classified properly, the storage system must be effective, and procedure for handling requisitions must be logical.

In "New Units for Transportation," C. Dorticos, General Electric Company, told of recent developments in equipment for street cars and described in detail certain of new products. Among the developments he listed are controller units with a larger number of points, automatic control, adaptable for foot as well as hand operation, quick application and release valves, magnetic track brakes, motors with greatly improved commutating characteristics to handle the higher accelerating current necessary for increased speed, twenty lamps in series for improved illumination and low voltage cut-out lamps. In concluding, Mr. Dorticos told about several applications of this modern equipment.

In analyzing the costs of operating buses in city service, D. D. Bentzinger, Iowa Southern Utilities, discussed factors that influence the figures. Among these are operating speeds, accidents, braking, tires, shop equipment, maintenance, uniform gasoline, oil reclaimers and depreciation. In the operating report for the Burlington fleet of 29 25-passenger buses, for the period of July, 1929, to July, 1930, Mr. Bentzinger gave costs per bus-mile as follows: roadway, .010 cent; equipment, 2.348 cents; gasoline, 2.051 cents; conducting transportation, 7.467 cents; traffic, .008 cent; general and miscellaneous, .369 cent; depreciation, 3.00 cents; and total costs, 15.523.

On the first day delegates were entertained at luncheon by the Des Moines Railway. At the annual banquet in the evening C. W. Gifford, general manager of the Des Moines Railway, was toastmaster. The entertainment program was elaborate. On the second afternoon the delegates inspected the new cars and the shops at Des Moines.



Delegates to Iowa Operators' Convention held at Des Moines

Coming Meetings

Jan. 8—Society of Automotive Engineers, annual dinner, Hotel Pennsylvania, New York, N. Y.

Jan. 19—Society of Automotive Engineers, annual meeting, Book-Cadillac Hotel, Detroit, Mich.

Jan. 22-30—Central Electric Railway Association, Claypool Hotel, Indianapolis, Ind.

Jan. 29-30—Central Electric Railway Accountants Association, South Bend, Ind.

April 8-9—Central Electric Railway Master Mechanics Association, Hotel Secor, Toledo, Ohio.

April 16-18—Annual State Convention, Missouri Association of Public Utilities, Excelsior, Mo.

Digitized by Google

$2,177,000 Equipment Issue Offered

Drexel & Company, Philadelphia, Pa., offered for public subscription on Nov. 24 at prices ranging in return from 4 per cent for the May 1, 1931, maturities to 5.25 per cent for the June 1, 1940, maturities $2,177,000 of Electric Railway Equipment Securities Corporation 4½ per cent equipment trust gold certificates dated Dec. 1, 1930. The certificates will be certified by Fidelity-Philadelphia Trust Company, Philadelphia, as trustee, and will represent less than 75 per cent of the cost of standard electric railway cars and their electrical and other equipment, the remainder having been paid in cash. Title to the equipment will be vested in the trustee for the benefit of the certificate holders. The equipment has been leased at rentals sufficient to pay these certificates and their dividend warrants as they come due. These leases and agreements and the notes representing rentals thereunder due from the various lessee companies will be assigned to the trustee.

The General Electric Company, Westinghouse Electric & Manufacturing Company and the J. G. Brill Company own all of the capital stock of Electric Railway Equipment Securities Corporation, which will unconditionally guarantee rentals sufficient to pay the certificates and their dividend warrants as they come due.

The equipment trust certificates cover a total of 163 cars, distributed as follows: 100 to United Railways & Electric Company, Baltimore, Md.; 40 to Des Moines Railway; 10 to Fitchburg & Leominster Street Railway; 7 to Rockford Public Service Company; 4 to Kansas City, Kaw Valley & Western Railway and 2 (oil-electric) to Hoboken Shore Railroad, a switcher.

What's in *News of the Industry*

Rapid transit proposal for Montreal.
Electricity advantageous for transport.
Business seems to have hit hard-pan.
Ohio road makes special Thanksgiving rate.
Study of suspended monorail asked.
Pull-Ins Middle States meeting topic.
Fare increase sustained in Niagara Falls.
"Old Times," recalled.
Christmas posters new style.
California comfort cars in campaign.
New Springfield proposal.
Seventy-five cent holiday pass.
Demonstration of fire prevention by trolley.
"The tax that breaks the street car's back."
Latest Brill trolley buses delivered to Chicago.
York Railways accepts new cars.
Steel motor cars for L. I. R. R.
English railway orders equipment.
Antiquated trolleys should be scrapped.

Conspectus of Indexes for December, 1930

Compiled for Publication in ELECTRIC RAILWAY JOURNAL by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years High	Last Five Years Low
Street Railway Fares*† 1913 = 4.84	Nov., 1930 **7.76**	Oct., 1930 **7.79**	Nov., 1929 **7.62**	Oct., 1930 **7.79**	Nov., 1925 **7.30**
Electric Railway Materials* 1913 = 100	Nov., 1930 **130.9**	Oct., 1930 **132.7**	Nov., 1929 **145.7**	Dec., 1926 **159.2**	Nov., 1930 **130.9**
Electric Railway Wages* 1913 = 100	Nov., 1930 **231.8**	Oct., 1930 **231.8**	Nov., 1929 **231.1**	Nov., 1930 **231.8**	Nov., 1925 **222.8**
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	Nov., 1930 **194.1**	Oct., 1930 **195.1**	Nov., 1929 **204.8**	Nov., 1928 **205.7**	Nov., 1930 **194.1**
General Construction Cost Eng'g News-Record 1913 = 100	Nov., 1930 **198.5**	Oct., 1930 **198.7**	Nov., 1929 **208.5**	Jan., 1927 **211.5**	Nov., 1930 **198.5**
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	Oct., 1930 **82.6**	Sept., 1930 **84.2**	Oct., 1929 **96.3**	Nov., 1925 **104.5**	Oct., 1930 **82.6**
Wholesale Commodities Bradstreet 1913 = 9.21	Nov., 1930 **10.06**	Oct., 1930 **10.30**	Nov., 1929 **12.40**	Dec., 1925 **14.41**	Nov., 1930 **10.06**
Retail Food U. S. Bur. Labor Stat. 1913 = 100	Oct., 1930 **144.4**	Sept., 1930 **145.6**	Oct., 1929 **160.5**	Nov., 1925 **167.1**	Aug., 1930 **143.7**
Cost of Living Nat. Ind. Conf. Bd. 1914 = 100	Oct., 1930 **151.9**	Sept., 1930 **152.9**	Oct., 1929 **163.4**	Nov., 1925 **171.8**	Aug., 1930 **151.6**
Industrial Activity Elec. World, kw.-hr. used 1923-25 = 100	Oct., 1930 **103.2**	Sept., 1930 **110.7**	Oct., 1929 **134.6**	Feb., 1929 **140.4**	Dec., 1926 **101.7**
Bank Clearings Outside N. Y. City 1926 = 100	Oct., 1930 **81.5**	Sept., 1930 **82.7**	Oct., 1929 **111.8**	Oct., 1929 **111.8**	Oct., 1930 **81.5**
Business Failures Number	Oct., 1930 1943	Sept., 1930 1763	Oct., 1929 1543	June, 1930 1874	Sept., 1928 1348
Liabilities, Millions of Dollars	**74.19**	**56.56**	**30.11**	**114.40**	**23.13**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads. †Revised to 1930 Census. See explanation page 756.

Montreal Rapid Transit

(*Continued from Page 771*)

on civic problems, since I have been Mayor of Montreal." He suggested that the address be printed in pamphlet forms in French and English, and distributed to leading organizations.

In a lengthy address, Mr. Watt tendered his hearers a comprehensive ambitious review of the city's transportation and traffic problems, and entered into a detailed discussion of the necessity for subways. The title of his address was "Should Montreal Build Subways Now?" His conclusion—and it was emphatically that of the Montreal Tramways and of leading engineers—was "Yes." He cited authorities to show transit was the first fundamental in the growth of a city, and that the problem could be met in two ways:

1. By important expropriations, which will provide additional streets, or widening of existing streets, to carry the traffic, not only of tramways, but also vehicular and pedestrian traffic.
2. By placing a portion of the traffic underground thereby releasing the streets for the balance of traffic, or, in other words, building subways.

In regard to expropriations, he stated:

It must be borne in mind that the providing of additional streets will not help the problem unless, at the same time, grade separation is provided at the junction of the principal arteries. For example, it will not assist traffic moving north to widen St. Urbain to 80 ft., and still force the traffic to stop at St. Catherine, Ontario, Sherbrooke and Pine Avenue to allow the east-west traffic to flow. Either St. Urbain would have to go underground or overhead at these streets and the same would be true of other main north-south thoroughfares. Therefore in considering the question of expropriations we must, at the same time, consider the question of grade separations.

Subways constituted the second remedy, Mr. Watt stressed, outlining the previously mentioned proposals for north and south-bound and east and west-bound subways, and the branch line. The estimated cost was $65,000,000 and the first question was: "How is the $65,000,000 to be raised, and from what source will the revenue be obtained to pay the interest and the sinking fund, which would amount, at the outset, to approximately $3,500,000 annually?"

EXHAUSTIVE PRESENTATION OF CASE

Supposing that the question was approved and it was decided to spend $65,000,000, necessitating an additional annual revenue of $3,500,000, the best way to obtain this amount, according to authorities (and Mr. Watt cited many), would be to distribute costs in three ways:

1. A share paid by the users of the service.
2. A share from the general revenues of the city.
3. A share by the property owners adjacent to the subways.

In regard to methods of payment, he first considered No. 3, payment of a share of the cost by property owners adjacent to the subway, stating that the history of subways in other cities establishes that immediately a subway was decided upon, property adjacent to it increased in value.

He said that if the fares were raised 1 cent, it would mean an additional revenue of slightly more than $2,500,000. If, instead of selling four tickets for 25 cents, seven tickets were sold for 50 cents, the annual receipts of the company would be increased by about $2,000,000 immediately. That is, if the fare were increased 1 cent, an amount inconsequential compared to the benefits accruing.

The extent to which Mr. Watt went into the details of the situation is instanced by the fact that the report of his remarks covers 22 typewritten pages.

Digitized by Google

Pull-Ins and Other Topics Enlivened Middle States Meet

Sixty members of the Middle Atlantic States Equipment Men's Association attended the third annual fall meeting at Ocean View on Nov. 11 and 12. On the first day of the meeting J. S. Dean, engineer Westinghouse Electric & Manufacturing Company, reviewed the work accomplished by the Electric Railway Association of Equipment Men, Southern Properties, in reducing pull-ins and improving maintenance costs. The members present received this talk with great interest and the lively discussions which followed indicated the importance attached to this work. The afternoon was taken up by the presentation of interesting motion pictures. "Modern Trends in Urban Transportation" was presented by L. E. Carter, General Electric Company; "A Treadle Travelogue," presented by A. Frank Paul, National Pneumatic Company; "Car Washing Machine," presented by B. A. Tozzer, Leeds, Tozzer & Company. Discussion followed each presentation.

The question box, composed of questions submitted by members, was discussed during the morning of the second day. Discussion of each of the twelve questions composing the question box resulted in a fruitful exchange of information. Among the problems discussed were vapor-locking in fuel lines, brake lining for motor coach operation, noiseless devices on street cars, waste and oil reclamation, relative merits of bronze axle bearings and iron babbitted bearings, and leaking car roofs. Following the luncheon, many of those in attendance accepted the invitation of T. W. Madison to inspect the Norfolk shops of the Virginia Electric & Power Company. After the inspection, the group was conducted on a sightseeing tour through the government naval base and about Norfolk.

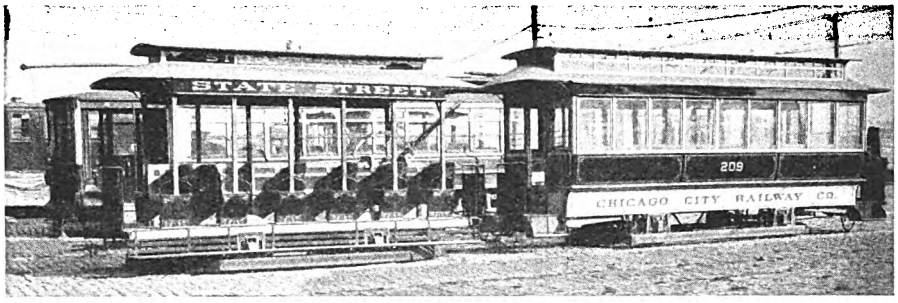
By a unanimous vote, the members accepted the invitation of H. W. McCarthy and R. D. Voshall to hold the next spring meeting in Washington, D. C., on May 14 and 15.

Niagara Falls Fare Increase Agreement Sustained

The Appellate Division of the Supreme Court has unanimously affirmed the order of Justice Staley in the Supreme Court denying an application to restrain the Public Service Commission, the International Railway and the city from entering into a contract for increased fares on local lines of the International Railway in Niagara Falls presaged on a liberal program of improvements.

Under an agreement between the railway and the city, the company was allowed to increase its fare from 5 cents to 8 cents on the basis of two tokens for 15 cents. Labor organizations in Niagara Falls carried the case to the Supreme Court which ruled in favor of the city and the railway. This decision has now been upheld by the appellate division. The order of prohibition was sought on the basis that the City Council should have submitted the proposal to a referendum. It also was alleged the Mayor was not legally entitled to vote to award a contract for increased fares.

The adjustment in Niagara Falls was the subject of review in the JOURNAL for August, page 543.



Replica of Chicago grip car pulling trailer

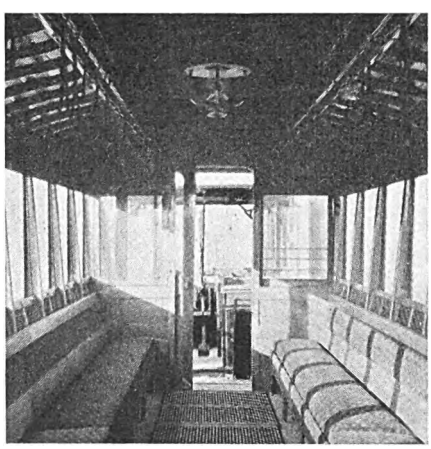
"Old Times" Recalled by Museum Gift of Late L. A. Busby

Part of the exhibit promised by the late Leonard A. Busby, president and director of the Chicago City Railway, to the Museum of Science and Industry, Chicago, founded by Julius Rosenwald, has been completed and will be installed in the transportation division of the Museum when it opens its doors to the public in 1932.

The exhibit will trace the development of urban transportation from its beginnings to the present day. It will, of course, start with the horse car. During the past year a replica of a horse-drawn car has been completed at the shops of the Chicago Surface Lines at 78th Street and Vincennes Avenue. It is completely and faithfully reproduced, from the kerosene headlight to the stove-pipe on the roof. Even the slot has been installed in which the fares were dropped and so rolled down an inclined plane along the length of the car into the fare box just behind the driver.

Another contribution is a replica of a cable-grip car and a trailer which ran on State Street in Chicago.

When Mr. Busby decided to build this exhibit he turned the matter over to Don McGill, superintendent of the shops of the Chicago Surface Lines. Mr. McGill's search for drawings of these old cars proved futile. Finally a photostatic copy of a grip car and train was secured from the Chicago Historical Society. Next there was an "old timers'" conference. Several men in the shops who had repaired cable cars prior to the advent of the electric car made pencil sketches from memory, and point by point the details were worked out. Some one recalled that the bell that had formerly hung about the horse's neck had been transferred to the axle of the cable car. Another remembered that the glass used in the monitor sash was known as "ruby glass" and that on it the words "State Street" were etched. A firm was found and the glass was made. Since horses were used to shunt the cable car from one track to another and to move it into the carhouse, the hooks to which the horses were harnessed were also included in the replica. A huge oil lamp had to be found and the proper kind of carpet to upholster the interior was the subject of another search by Mr. McGill.



An interior view through trailer to grip car

Type of car that ran on Archer Avenue

When both cars were finished Mr. McGill started on his final quest. A horse car is incomplete without a horse, and so, Chicago and its environs were combed to find a horse that would do justice to the exhibit. A papier maché horse was secured, measured for a set of new harness and now awaits installation in a niche in the transportation division of the Museum of Science and Industry.

The accompanying photographs made by its department of photography are reproduced by courtesy of the Museum.

Study of Indianapolis Proposal Planned

Directors of the Indianapolis Chamber of Commerce have announced that its civic affairs committee will inquire into the facts relating to the future operation of local transportation facilities in Indianapolis as involved in the proposed plan of reorganization and refinancing of the Indianapolis Street Railway.

This committee intends to study the recent reorganization proposals, and to inquire into the manner in which service-at-cost franchises have operated in other cities, the rates of fare prevailing in other cities, costs of operation, character of service and other features enlightening to local consideration of the plans. The findings of the committee will be made public.

Digitized by Google

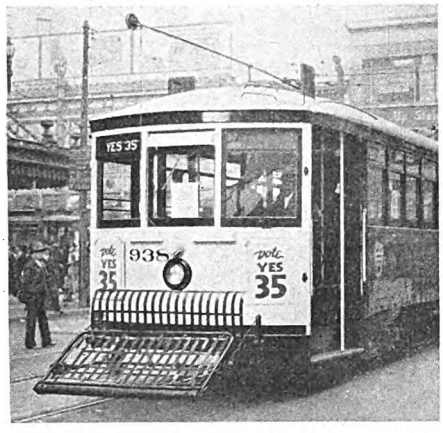
Take the Children to See Santa!

They Didn't Shop Early!

This year's Christmas posters of A.E.R.A. are different

Model San Francisco Car Used in Franchise Campaign

One of the latest model "California Comfort Cars," built in the shops of the Market Street Railway, San Francisco, was used for advertising purposes during the election campaign for a 25-year operating permit for the privately owned companies. The measure was No. 35 on the ballot. The accompanying illustration shows some of the uses the new car was put. Now that the voters have approved the granting of the permit, the company plans to start immediate production of 100 of these new



San Francisco car an effective campaign appeal

cars. This new car is 3½ tons lighter than any previously produced by the company. Gears are leaded to reduce noise and gear boxes are insulated with a special sound deadener, which is also placed under the flooring of the car for its entire length.

Trolley Buses Included in New Springfield Proposal

At a conference held on Nov. 21 between city officials of Springfield, Ohio, and executives of the Cincinnati & Lake Erie Railroad, H. C. Donecker, vice-president, presented the outline of a transportation system practically equivalent to that now in operation which contemplates retention of the present rate of fare for an indefinite period. The new proposal includes the elimination of two minor divisions which have been operating at a loss, the part-time operation of trolley buses on two other lines, and increases of service and headway on four other divisions which have been making a profit.

The tentative plan of routing met with the approval of Clyde E. Wallingford, city manager, and the five city commissioners, who also approved the retention of the present rate of fare. The company is seeking a new grant and has been invited by the city to submit a tentative franchise embodying the routes suggested and other details. City officials want to conclude the negotiations in order to proceed with paving.

FOREIGN NEWS

British Borough To Test Two Types of Trolley Bus

The County Borough of Walsall, England, has decided to install a trolley bus system at an estimated cost of $33,910. Service will be started with four trolley buses of two different types. Two of these will be A.E.C.-English Electric double-deck, low-loading buses driven by direct-current 80-hp. engines, and equipped with Westinghouse brakes, while the other two will be Guy trolley buses equipped with motors of the regenerative type.

The object of ordering two vehicles of each kind is to enable the corporation, if and when it decides to extend its trolley bus operations, to choose between these two types of machines.

Details of the A.E.C.-English Electric model indicate that the most distinctive feature of its design is the placing of the motor in front of the chassis so that practically the whole of the electrical equipment is centralized in or close to the driver's cab. Ease of access is insured by a removable louvre panel.

British Transport Minister Modifies Public Control Idea

At a staff dinner of the London Underground Railway combine recently, Herbert Morrison dealt with the Government's plans regarding London passenger transport. Mr. Morrison said that suitable measures would be included in the London traffic co-ordination scheme to secure fair treatment for the officers and employees of the undertakings to be taken over by the public body. He said:

The old idea of the provision of London traffic facilities is to leave it to individual competitive undertakings to find out public needs and, if meeting these needs is thought to be a profitable enterprise, to enter the field. It was also thought sound that if other private undertakings also started services in competition this meant plenty of transport and lower fares. We have now come to realize, particularly in cases like the Greater London area, that it is necessary to regard passenger transport as a whole, to see that the service is adequate and effective to meet public needs, and at the same time to avoid the provision of wasteful services and commercial failure.

Despite the measure of consolidation which now exists in London passenger transport, there is plenty of room for further co-ordination. The choice really lies between a huge private monopoly and some form of co-ordinated public service. In the important negotiations on which I am entering I have every hope of securing the good will not only of the general public, but of those private and public undertakings engaged in providing passenger services in Greater London.

Trolley Bus for Lancashire

In Lancashire, the South Lancashire Transport Company is planning a course of future expansion different from that which will probably be followed in Liverpool. This company, which operates a widespread system over a densely populated area, has begun a change-over to the trolley bus, chosen in preference to a bus service—the medium hitherto adopted by the majority of municipalities and railway undertakings which have had cause to change their method of transport.

✦

Johannesburg, South Africa — The general manager of the Johannesburg Municipal Electricity Department has prepared a report which recommends the use of trolley buses in certain sections of the city. It is suggested that expenditures on the tramway system be reduced to a minimum and that, where possible, the trolley bus be used. The system now consists of 84 miles of permanent way, with 198 cars. The total capital expenditure on the system, as of June 30, 1929, was £1,379,121. At present 38 gasoline buses are run.

Digitized by Google

Christmas Shopping Pass for 75 Cents in Milwaukee

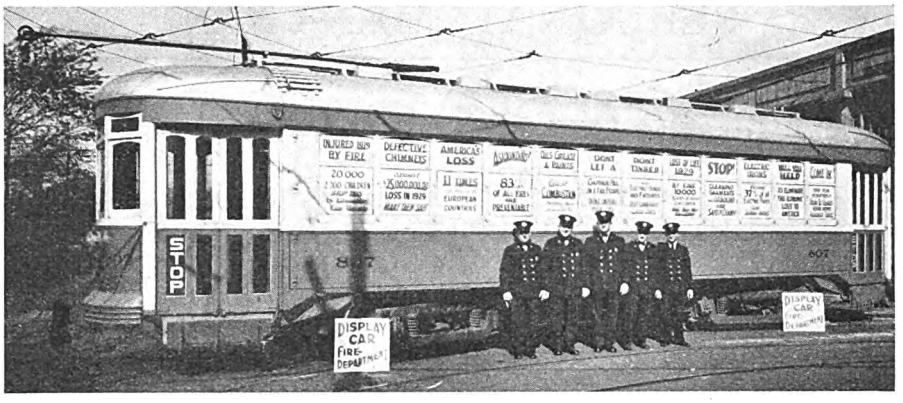
To stimulate Christmas shopping and to encourage riding during non-rush hours, the Milwaukee Electric Railway & Light Company will sell a special Christmas shoppers' weekly pass for 75 cents. The new pass will be valid on all street car and auxiliary bus lines in the single fare area and will be transferable. It will supplement the unlimited $1 weekly pass. The special pass will be in effect for five weeks, beginning Nov. 30. It will be good at all timse except between 5 a.m. and 9 a.m. weekdays, between 4 p.m. and 7 p.m. weekdays, and between 5 a.m. and 9 a.m. Saturdays. It will be good all Saturday afternoon and evening, and all day on Sundays and holidays. President Way said:

We believe that the low fare offered during the holiday season by means of the Christmas special pass will stimulate shopping and tend to hasen the return of normal business conditions. We also hope it will increase street car riding in the non-rush periods and contribute to the relief of peak hour traffic congestion. During the holiday shopping period the riding by shoppers tends to overlap the riding of office and industrial workers. This results in inconvenience and delays to all users of the service.

Passes will be available for purchase on street cars and buses. They will also be available at the company offices and car stations, and at the Boston store, Gimbel's and the three Schuster stores. Use of the special pass will be discontinued automatically after Jan. 3.

New York Substitution Plea Amended

The New York City Omnibus Corporation, subsidiary of New York Railways Corporation, has filed with the Board of Estimate a supplement to its original application for franchises to operate buses on seven crosstown lines, asking for franchises to operate nine more lines in the Borough of Manhattan. The plan amounts to motorization of the entire New York Railways system. The application proposes that on all but two lines, the company will charge a 5-cent fare. The other two lines, are divided into two 5-cent zones. A charge of 2 cents will be made for transfer at intersections.



Fire prevention car with members of local fire department in charge

Fire Prevention Demonstration at Harrisburg by Trolley Car

"Fire Prevention Week" at Harrisburg, Pa., meant more to the Harrisburg Railways than mild participation on its part in the event. And the accompanying illustrations substantiate this statement. Through a car offered to the local fire department for display purposes and through the co-operation of that department, local Chamber of Commerce, Pennsylvania Power & Light Company and the Harrisburg Gas Company, together with the district officers of the Fire Underwriters Association the exposition program was brought to the attention of the people of Harrisburg and surrounding towns.

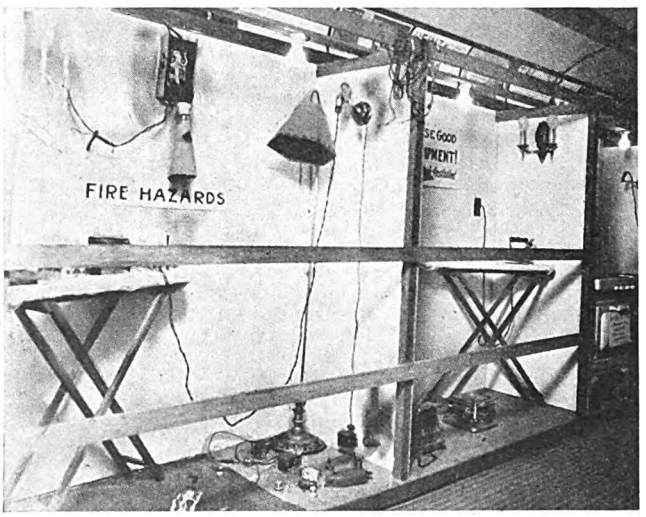
The car was on display in what is known as Market Square, Harrisburg, daily, from 11 a.m. to 1:30 p.m. and from 5 p.m. to 10 p.m., and at such times was in charge of assigned members of the Harrisburg fire department who conducted visitors through the car and explained the various displays.

During the week, and at times when not on display at Market Square, the car was routed to the outlying communities as well as the various schools and at each of these points the attendance was quite large. The method of display received a considerable amount of favorable comment from the local newspapers. Fire department records showed nearly 15,000 people boarded the car and examined the various displays. These consisted of numerous exhibits of electrical equipment of a fire-hazard type, modern methods of electrical installation, obsolete and modern fire prevention equipment, hazardous and safe brick chimney construction, modern fire alarm boxes and other features designed to educate the public in fire prevention. One of the modern fire alarm boxes being installed throughout the city was so hooked up with a fire gong in the car that actual demontrations were made for the benefit of visitors to show how to turn in an alarm in case of a fire.

Timely Tax Text

Under the title "The Tax that Breaks the Street Car's Back," Leslie Vickers, economist American Electric Railway Association, has contributed a timely analysis of street railway taxation to the Nov. 27 issue of *Public Utilities Fortnightly.* To street railway operators the fact that their properties are loaded with tax burdens, is no secret. The general public, however, knows little of the situation. Mr. Vickers' article helps to throw light upon this.

General interior view showing modern and obsolete fire prevention equipment



Booths contrasting hazardous and safe ways of installing electrical equipment

Digitized by Google

PERSONAL MENTION

Segregation of Ohio Rail and Bus Lines Announced

Messrs. Sammis, See and Graham Appointed to Chief Executive and Operating Posts With Transportation Securities Corporation, Successor to Transportation Lines of Ohio Edison Company

A. C. BLINN, vice-president and general manager of Ohio Edison Company, announced on Nov. 15 that Ohio Edison Company had sold all of the common stock of Akron Transportation Company, Northern Ohio Interurban Company, Canton Traction Company and the Cleveland-Akron-Canton Bus Company to Transportation Securities Corporation. By this sale, Ohio Edison disposes of its entire interests in the transportation business and hereafter will be engaged exclusively in the electric and steam heating business. Mr. Blinn and L. G. Tighe, vice-president and Akron Division manager of Ohio

W. H. Sammis

Edison Company, who have been officers of the transportation companies, retire as such and neither they nor any of the employees of Ohio Edison Company as now constituted will hereafter have any connection with the transportation business.

Transportation Securities Corporation is headed by W. H. Sammis, New York, as president; R. N. Graham, Youngstown, as vice-president; P. V. C. See, Akron, vice-president and general manager; J. B. Waring, Akron, is secretary and treasurer, and W. O. Zehm, Akron, auditor.

In addition to Messrs. Sammis, Graham and See, the directors are D. A. Scanlon, formerly general superintendent of railways of Northern Ohio Power & Light Company, as transportation superintendent; W. J. Ruof, vice-president Central-Depositors Savings & Trust Company; W. A. M. Vaughan, vice-president of the First-City Trust & Savings Bank, and E. A. Oberlin, president Firestone Trust & Savings Bank, all of Akron.

Mr. Sammis has recently been connected in New York with the Commonwealth & Southern interests, which control the systems in Ohio. Among his other work there he has been assistant to T. A. Kenney, vice-president of the Allied Power & Light Corporation. He was at one time with the Consumers Power Company in Michigan. Also for a time he was an instructor in electrical engineering in Columbia University. He joined the power staff of the Charles H. Tenney Company in 1924, but previous to that he had been connected with the Public Service Electric Company and the Brooklyn Rapid Transit System. From 1917 until the fall of 1929 he was in the United States Naval service. He was graduated from Columbia and has written frequently on technical subjects, notably a treatise on aircraft ignition equipment.

Operating Officials of Wide Experience

Mr. See has been engaged in the transportation business for many years. He is a graduate of Armour Institute of Technology from which he later received an advanced degree in electrical engineering. He had his early training as car building inspector and foreman with the Chicago Elevated Railways. He was also general foreman for the Twin City Rapid Transit Company, St. Paul, Minn. He next became general foreman for the Illinois Traction System at Decatur, Ill. Mr. See next went to New York and for eleven years was superintendent of equipment for the Hudson & Manhattan Railroad operating between New York and New Jersey. His experience has thus covered every phase of transportation—city and interurban, elevated and subway cars, buses, truck and automobiles. At present he is first vice-president of the American Electric Railway Engineering Association. He has been active in the work of the master mechanics group affiliated with the Central Electric Railway Association, as well as the national association.

R. N. Graham

He is now and has been a member of the transportation and maintenance committee of the Society of Automotive Engineers. He has been engaged in transportation work in Akron for the last ten years as superintendent of rolling stock and equipment.

Like Mr. See, Mr. Graham has made many notable contributions to the art of mass transportation. He has been a frequent contributor to the technical press, and his papers and discussions before national and sectional associations have been especially welcome for the wealth of information they have contained. He played his part in securing the award of the Coffin medal to the Penn-Ohio system and scored again last year in the winning of that award by the Youngstown Municipal Railway. He is a lawyer turned railway man, going to Youngstown in 1917 to manage the railways of the Mahoning & Shenango Railway & Light Company. He was born in Jackson, Mich., in 1877, and was graduated from the University of Arkansas with the class of 1898. He then practiced law in Joplin, Mo., until 1908, and during this time served as a member of the Missouri Legislature from the Joplin district. Mr. Graham entered the electric railway field through a connection of several years with the legal department of the Houston Electric

P. V. C. See

Company and the Galveston-Houston Electric Railway, Houston, Tex. In 1916 he was made assistant manager of railways of the Mahoning & Shenango system in charge of the railway properties. While Mr. Graham practiced before the bar his work in Missouri, Kansas, Oklahoma and Texas dealt largely with municipal and corporation problems.

D. A. Scanlon has been general superintendent of railways for many years for the Northern Ohio Power & Light Company. He has been retained by the new transportation organization as superintendent.

Transportation Securities Corporation, the purchaser of the stock ownership of the transportation companies sold by Ohio Edison Company, is a holding company which now owns the common stock of the street and interurban railway and motor bus companies operating in Youngstown and other communities in eastern Ohio and western Pennsylvania.

The plan of organization of the Ohio Edison Company and a statement of its personnel were the subject of review in Electric Railway Journal for August, 1930, page 545.

Digitized by Google

Railway Official Heads West Virginia Operators

C. H. Hardesty, recently elected president of the Public Utility Association of West Virginia, is vice-president of the Monongahela-West Penn Public Service Company in charge of generation, distribution and sale of electricity for the company, which now furnishes various types of public utility services in 27 counties in northern West Virginia; Washington and Noble Counties, Ohio; Garrett County, Md., and Fayette County, Pa.

Mr. Hardesty has literally come up from the ranks. Having worked in numerous departments on several divisions, Vice-President Hardesty has a wide acquaintance among employees. Outside the company, too, he is known as one of the able utility executives of the country, and at present is president of the East Central division of the National Electric Light Association, which includes the states of West Virginia, Ohio and Kentucky.

Mr. Hardesty was born in Marion County, and after he was graduated from West Virginia University he was employed by the Western Maryland Railroad from 1915 to 1917. His first work with the company was in the purchasing department where he started Dec. 27, 1917. He was appointed superintendent of the Clarksburg division on May 1, 1920. Other

C. H. Hardesty

positions he has held include traveling freight and passenger agent, general traffic manager, manager of the Parkersburg and Marietta division, and assistant to the president. Mr. Hardesty was appointed vice-president in charge of electrical production and sales on Feb. 6, 1929.

Twenty Year Club Has Distinguished Member

Honorary membership in the Twenty Year Club of the Indianapolis Street Railway has been conferred upon Louis Ludlow, representative in Congress from the Seventh Indiana district. Mr. Ludlow was in newspaper work and was political correspondent at Washington for numerous publications prior to his election to the House of Representatives. As the principal speaker at the club's annual dinner and meeting, he related humorous incidents in his early experience with the railway and its employees while he was in newspaper work in Indianapolis twenty years ago. Beck Lowe, an employee in the shops department, received a testimonial belt awarded each year to the employee with the best service record. He has been employed by the company for 50 years.

New Jersey Railway Operating Officials Are Advanced

Philip F. Maguire Made Superintendent Maintenance of Way in Transport—Thomas P. Burke Becomes Manager and George Klement Assistant in Central Division

P. F. Maguire

ANNOUNCEMENT has been made by Vice-President Matthew R. Boylan, Public Service Co-ordinated Transport, Newark, N. J., of the appointment of Philip F. Maguire to be superintendent of maintenance of way, to succeed the late Martin White. Mr. Maguire, who has been manager in the central division, will be succeeded in that position by Thomas P. Burke, formerly assistant manager. George Klement has been named assistant manager in the central division.

Mr. Maguire has been central division manager since November, 1925, and superintendent of that division for six years prior to 1925. He has been in the continuous employ of Public Service and predecessor companies more than 34 years. He has risen, step by step, to his new position from the platform of a street car, for in August, 1896, he started with the Plainfield Street Railway as a conductor. In 1899 he was promoted to inspector at Plainfield, and in 1903 was made supervisor in charge of the Union line, Plainfield lines and the Rahway line. To familiarize himself with the work of the department of which he now becomes superintendent, Mr. Maguire was transferred to the maintenance of way department in April, 1906, and became assistant superintendent of that department in 1915. He

T. P. Burke

remained there until 1919, when he was promoted to superintendent of the central division.

Mr. Burke has held various positions in transport work with Public Service and was stationed in Perth Amboy, Westfield, Plainfield, New Brunswick and Newark. He began his career in transportation work in 1894, at Bridgeport, Conn., in the employ of the Radel Brothers, who also owned the Middlesex & Somerset Traction Company in New Jersey to which they transferred him in 1900, as an inspector at Bound Brook. When Public Service acquired the Raritan Traction Company in 1904, Mr. Burke was sent to Perth Amboy to take charge. In 1905 he was appointed supervisor in charge of Plainfield and Westfield lines. In 1906 he was appointed supervisor of all lines operating out of New Brunswick, where he remained until

G. Klement

1918, when he left Public Service to take another position. In 1925 he returned to Public Service and was assigned to Essex division. He was supervisor at Miller Street carhouse and Sherman Avenue garage in Newark just prior to his promotion in March, 1927, to assistant manager of central division, one of the system's largest.

Mr. Klement began his association with Public Service in April, 1915, as a conductor at Miller Street carhouse. He then served for two years on the "Fast Line," operating between Newark and Trenton. He was appointed stationmaster at Miller Street in 1919, and held this position for seven years. In 1926 he became road supervisor at Central Avenue carhouse, later holding a similar position at Big Tree, Roseville and Hilton carhouses. He has recently been Bloomfield district superintendent, Essex division.

Raymond S. Tompkins, assistant to the president of the United Railways & Electric Company, Baltimore, has been elected to the board of directors of the Better Business Bureau of the Advertising Club of Baltimore.

Digitized by Google

Honolulu Official in Elective City Office

Leroy C. Bush, chief engineer of the Honolulu Rapid Transit Company, Ltd., Honolulu, Hawaii, was elected a member of the board of supervisors of the city and county of Honolulu at the general election on Nov. 4. This was Mr. Bush's first attempt at politics. He not only lead the Republican ticket in the primary election, but received more votes than any of the many other candidates in the general election. As the supervisors in Honolulu devote only part time to city work, the election will in no way interfere with his duties with the local railway. He will be chairman of the important public works committee of the supervisors.

Mr. Bush entered the employ of the Honolulu Rapid Transit Company in April, 1922, as assistant engineer in the maintenance of way department. His promotion with the company was rapid. He assumed his present position in February, 1928. He was born in Honolulu on Dec. 1, 1897, and attended public schools there. In 1920, he was graduated from the University of California with a degree in mechanical engineering. After taking the student engineers' course at the Allis-Chalmers plant in Milwaukee he returned to Hawaii.

G. R. Green Vice-President as Well as Manager

George R. Green, general manager of the Northern Indiana Railways, Inc., South Bend, has been elected vice-president of the organization. He succeeds Harry Wair, South Bend attorney, who recently died.

Two new directors have also been elected. They are Arthur L. Hubbard, president of the First National Bank, South Bend, and Allison E. Stuart, Lafayette, Ind. Mr. Hubbard fills the place on the board of directors left vacant by the death of Mr. Wair, and Mr. Stuart occupies a position that has not been filled since the corporation was reorganized last year.

The board of directors of the Northern Indiana Railways, Inc., now consists, in addition to Mr. Hubbard and Mr. Stuart, of Alfred P. Dietrich, New York City; A. H. Plumb, Emporia, Kan.; R. R. Smith, South Bend; Alva Kitselman, Muncie, Ind.; and W. C. Ewen, New York City.

The officers are Mr. Smith, president; Mr. Green, vice-president and general manager, and O. A. Small, secretary-treasurer.

Herbert C. Lummis Retained in Washington

Services of Herbert C. Lummis, an engineer of wide experience on many properties in different parts of the country, have been retained by the Capital Traction Company, Washington, D. C., in connection with the valuation of its property now being made by order of the local Public Utilities Commission. Mr. Lummis has already taken over his new duties and will have charge of this work under President J. H. Hanna.

For six years Mr. Lummis was staff engineer of the board of supervising engineers in Chicago, which has supervision over the surface lines of that city. Recently he has been engaged as a consultant in valuation and rate cases, rapid transit routes and leasing street railway routing, etc. in Philadelphia, New York, Montreal, Washington and Buffalo.

Mr. Lummis was born in Georgia, educated in the public schools and received his degree in Civil Engineering in 1912 from the University of Colorado. After he was graduated, his first connection was with Bion J. Arnold, Chicago. He was an assistant engineer in the study of the transportation facilities of San Francisco in 1913 made for the city by Mr. Arnold.

While on the Arnold staff Mr. Lummis made reports on routings, rapid transit plans, entered into financial and accounting studies and engaged in other urban transportation work of similar character in most of the large cities of the country. He was principal assistant engineer in the valuations of the surface system of the Brooklyn Rapid Transit Company. He also had charge of the valuation of the Aurora, Elgin & Chicago Railway in 1919.

Tudor W. Jones, auditor of the Indiana Railroad, Anderson, Ind., formerly the Union Traction Company of Indiana, has resigned his position. He was connected with the Union Traction Company for 25 years, having started as ticket agent at Anderson in 1905. For the past nine years he has been auditor of the company. Mr. Jones expects to devote his attention to other interests after a brief vacation. No successor has been named to fill the position.

A. J. Lundberg Heads Revamped Oakland Transportation System

A. J. Lundberg

A. J. LUNDBERG, who heads the reorganized Key System Transit, Oakland, Cal., entered that company as a representative of banking interests when the affairs of the railway seemed darkest several years ago. His announced intention was to restore the company's credit and put its securities on a sound basis. That task proved insuperable without reorganization, and the readjustment was carried out recently. In some respects it has been drastic but no more so that the changed economic conditions under which the company is now forced to operate seemed to make desirable. As a result there has been evolved the East Bay Street Railways operating the street railway lines, the East Bay Motor Coach Lines operating the bus lines, the Key System operating the transbay service and the Key Terminal Railway operating the ferry services. Stock of these companies is held by the Railway Equipment & Realty Company, with Mr. Lundberg at its head, as he is of the subsidiary companies, except the Terminal Company.

As just indicated, Mr. Lundberg took over the administration of the old transit company when it was in a precarious financial condition. He headed a new management that represented in many respects a complete change in company policies. The reorganization of the old Key's tangled affairs could not be avoided, but the readjustment was unusual in many respects. In spite of its size and the number of security holders involved, the costs of the readjustment were low. The members of the readjustment committee, without compensation, assumed the responsibility involved and devoted their time to the many meetings and discussions. Due to the co-operation of many financial institutions, no expenditure was incurred for the solicitation of security holders other than the preparation and mailing of literature. Under the plan which was finally put into effect, the funded debt of the old transit company was reduced from $20,000,000 to $4,500,000, all of which is in the form of equipment trust certificates.

Although primarily a banker, Mr. Lundberg brought to the Key System an uncanny sense of values. He was keenly alive to the economic changes in transportation, and he and his associates left no stones unturned, so far as it was possible, to merchandise the service. But he didn't overlook economies. He faced the problems firmly as they arose and when the time came for financial readjustment he was just as thorough in his housecleaning as he had been in his efforts to rehabilitate the property physically and from the point of selling the service more intensively.

Primarily a Banker

Mr. Lundberg's first business connection was with the Bank of San Francisco, which later was absorbed by the Bank of Italy. He entered the employ of the bank in 1909, and in 1910 became an employee of the state banking department under Alden Anderson, superintendent of banks. A year later he became secretary to Herbert Fleischhacker of the Anglo and London Paris National Bank in San Francisco, remaining in that capacity until 1912. In the latter year he accepted a clerkship in the brokerage firm of J. Barth & Company in San Francisco, becoming a partner in that concern in 1926.

Mr. Lundberg was born in San Francisco. He received his education in the public schools of his native city. He was the first president of the San Francisco Stock and Bond Exchange.

Digitized by Google

Col. R. H. James Indiana Operating Executive

Col. Ralph H. James, vice-president of the Chicago, South Shore & South Bend Railroad and Chicago, North Shore & Milwaukee Railroad, has been elected vice-president in charge of traffic of the Indiana Railroad. Robert M. Feustel, president of the Indiana Railroad, made the announcement. Mr. Feustel also announced the election of William J. Knorst as assistant vice-president, and Edwin J. Booth, as assistant to the president.

As vice-president in charge of traffic of the Indiana Railroad, which formerly was the Union Traction Company of Indiana, Colonel James will be chief traffic executive of the entire Indiana Railroad System. He will be assisted by Mr. Knorst.

The Indiana Railroad System includes the electric interurban railway lines of the Indiana Railroad, Interstate Public Service Company, Indiana Service Corporation and Northern Indiana Power Company, comprising a total of more than 700 miles of track.

Colonel James served in the World War as an officer in the British army.

J. C. McPherson in New Southern Pacific Post

J. C. McPherson, for the past eight years superintendent of the East Bay electric division of the Southern Pacific Company, has been made general representative of the organization with headquarters in Oakland, Cal. This appointment followed the consolidation of the East Bay Electric and Western divisions of the Southern Pacific. He will represent the operating department in public relations in the East Bay cities and have charge of the company's real estate in Alameda and Contra Costa Counties.

Mr. McPherson entered the employ of the Pacific Electric Railway at Los Angeles in 1895 as a conductor, and advanced until he became superintendent of the northern division of the electric system. In 1913 he was appointed to take charge of the Oakland, Berkeley and Alameda electric lines. Following the war, he returned to the Pacific Electric in 1919 as assistant general superintendent, which position he held until he again took charge of the East Bay electric lines in 1922.

English Editor Appreciative of American Courtesies

Horace Wyatt, director of *Bus and Coach* and *Motor Transport*, published in London, England, has returned home after a visit of more than six weeks in the United States and Canada. Mr. Wyatt came here primarily to attend the International Road Congress in Washington, but, at the conclusion of the sessions of the Congress, he traveled in the East and the Central West to study bus and truck operation. He was a particularly interested observer at the meeting of the transportation section of the Society of Automotive Engineers held in Pittsburgh.

In England the problem of the competition of the private car with the mass transportation agencies is not so acute as it is here, and, as yet, the problem of the parked car has not manifested itself there to anything like the same degree. However, Mr. Wyatt feels that his visit to the United States and Canada has greatly increased his understanding of these problems just as it has his realization of the problem of the pirate taxi.

During his stay, Mr. Wyatt interviewed, among others, many electric railway operators. In discussing his trip with a representative of ELECTRIC RAILWAY JOURNAL, he expressed his appreciation of the many courtesies extended to him here, stressing particularly the degree of candor with which executive officers and officials discussed operating and engineering problems with which they are confronted.

Consulting Engineering Office Opened by A. H. Armstrong

A. H. Armstrong, assistant engineer of the railway department of the General Electric Company for many years, and more recently chairman of the railroad electrification committee, and consulting engineer for the transportation department, has established a private consulting engineering office at 16 Troy Road, Schenectady, N. Y.

A. H. Armstrong

An outstanding authority on electric traction in the United States, he has contributed much fundamental information to textbooks on this subject, as well as exhaustive papers before various technical societies. His numerous studies of railroad electrification projects and, more particularly, his intimate connection with such electrification work as the Chicago, Milwaukee, St. Paul & Pacific, the Butte, Anaconda & Pacific, the New York Central, and other well-known electrifications, have especially qualified him for the consulting work which he is now entering upon in connection with railroad electrification.

Mr. Armstrong was graduated from Worcester Polytechnic Institute in 1891. He entered the employ of the Thomson-Houston Company at Lynn, Mass., in the same year. He joined the railway engineering department of the General Electric Company in 1897, and since that time has devoted most of his energies to the study of railroad problems.

He is a member of the American Institute of Electrical Engineers, the National Electric Light Association, the American Electric Railway Association, the American Railway Engineering Association, and other societies.

George Wright in Charge of Toronto Garages

George Wright, for the past ten years material superintendent of the way department of the Toronto Transportation Commission, Toronto, Ont., has been made superintendent of the garage department. Mr. Wright was born in Halifax, N. S. He was graduated from the Faculty of Applied Science of the University of Toronto in 1907. He spent a year on the staff of the University, a year with the Canadian Northern Railway, three years as assistant engineer of maintenance of way with the Grand Trunk Railway, three years in the City of Toronto Works Department, two years supervising construction with the Warren Paving Company, one year deputy engineer of London, Ontario, three years as city engineer of London. He also served as field engineer on plans in taking over the Toronto Street Railway, after which he spent two years with the department of highways in charge of Eastern Ontario work. Leaving the highways department, he worked in 1920 on the valuation of the property of the Toronto Railway, later taken over by the city, and was then appointed material superintendent of the T.T.C.

W. H. Swift, Jr., at Springfield

William H. Swift, Jr., for four years manager of the New Brunswick Power Company, with 25 miles of electric railway in St. John, N. B., and suburbs, has assumed his duties as manager of the Springfield Gas & Electric Company and the Springfield Traction Company, Springfield, Mo., succeeding A. E. Reynolds, transferred to St. John.

At the time of his departure from St. John, Mr. Swift was tendered a farewell banquet in the Union Club, St. John, attended by 100 men. During the dinner, he was presented a silver cigar and cigarette container, engraved with these words: "William H. Swift, Jr.—from friends and business associates in Saint John, N. B., Canada, Oct. 29, 1930." The presentation was made by the Mayor. There were speeches by the Mayor, Premier of the Province, W. S. Fisher, a member of the board of directors of the New Brunswick Power Company, and by Mr. Swift, and his successor, Mr. Reynolds, Mr. Swift having remained to introduce Mr. Reynolds.

Another Decoration for Arthur Gaboury

The Government of the French Republic has bestowed on Arthur Gaboury, secretary-general of the Province of Quebec Safety League. Montreal, the decoration of "Officier de l'Instruction Publique." This is the second decoration awarded Mr. Gaboury, for in 1918 the French Republic on the recommendation of the "Union Nationale Francaise" of Montreal bestowed on him the "Palmes Académique" for the excellent services rendered by him in the promoting and furthering the cause of French Canada. Moreover, in July, 1908, the "Union Nationale Francaise" presented him with a gold medal as a testimonial to the work done and service rendered to the French cause.

Arthur Gaboury is known throughout

Digitized by Google

the Province of Quebec as the safety standard bearer. As secretary-general of the Province of Quebec Safety League his word on all matters appertaining to safety measures is accepted as final. Created in 1923, the Safety League has grown to an organization covering practically every industrial firm of note in the Province.

Mr. Gaboury entered business with the Montreal Tramways on June 6, 1893, finally becoming head of the claims department. The year 1914 saw the birth of a campaign of accident prevention, a movement that was actually the foundation of what is now known as the Province of Quebec Safety League, organized by Mr. Gaboury when he left the Montreal Tramways. For 1920-1921, Mr. Gaboury was president of the Canadian Electric Railway Association. He also served as a member of the executive committee and Canadian representative of the American Electric Railway Association.

B. C. Palmer Represents Ohmer in Chicago

Complete charge of the Chicago branch of the Ohmer Fare Register Company has been assumed by B. C. Palmer, special sales engineer for that firm since 1927. In addition to supervising the business offices there, and continuing in his capacity of general sales manager for the company's taximeters, cash registers, and recording devices, Mr. Palmer will direct Ohmer activities over a large surrounding territory of eight states.

✦

A. C. Moorhaus, purchasing agent of the Union Gas & Electric Company, Cincinnati, Ohio, since 1924, has been made acting general manager of the company. Mr. Moorhaus became affiliated with the Union Gas & Electric Company six years ago, after resigning as secretary of the Scioto Valley Railway & Power Company, Columbus. W. R. Freeman, assistant to Mr. Moorhaus since March of this year, becomes acting purchasing agent of the Union Gas & Electric Company.

✦

Roy V. Wright, of New York, managing editor of *Railway Age,* has been elected president of the American Society of Mechanical Engineers for 1931. Mr. Wright succeeds Charles Piez, of Chicago. He will be installed at the annual meeting in New York Dec. 1-5. Mr. Wright is a graduate of the University of Minnesota. He has been in railway mechanical work for 32 years.

✦

T. Justin Moore, vice-president and general counsel for the Virginia Electric & Power Company, Richmond, Va., was elected president of the Virginia Public Utilities Association at the closing session of the fifth annual convention of the organization at Virginia Beach, Va., on Nov. 14.

✦

Neill W. Funk, safety director and head of the claims department of the Louisville Railway, Louisville, Ky., who has served several short terms under appointment as police judge of Louisville, recently accepted another appointment for relief duty, but has announced that his judgeship salary would all go to charity.

OBITUARY

Martin White

Martin White, superintendent maintenance of way Public Service Co-ordinated Transport, Newark, N. J., died on Oct. 25. Mr. White began his connection with street railway work some 37 years ago when he took a position as track foreman with the Rapid Transit Street Railway, a predecessor company of Public Service. Since that time he was continuously in the company's employ, achieving the unusual record of holding the position of superintendent of maintenance of way for almost a quarter of a century.

Mr. White was thoroughly versed in the transportation business with which he had been identified many years, and in electric railway circles throughout the country he was known as an expert in the maintenance of way field. Matthew R. Boylan, vice-president in charge of operation, paid tribute in *Public Service News,* company

Martin White

publication, to Mr. White as a close friend and valued counselor over a long period of time and through many struggles. Mr. Boylan said that "he was a true gentleman, in the best sense of that term—product of a school which is rapidly vanishing. His honesty, loyalty and genial nature commanded a host of friends, none of whom will miss him more than we, his Public Service associates."

Mr. White's skill and ability in all matters pertaining to maintenance of way work soon brought him into wide prominence in engineering circles in New Jersey. He was the first to suggest the use of clipped stone block in paving between rails and he contributed many valuable suggestions to the makers of special track work at intersections and railroad crossings.

Born in County Galway, Ireland, in 1859, Mr. White came to this country when he was sixteen years old. Prior to his association with the Rapid Transit Street Railway he worked for some time in the maintenance of way department of the Pennsylvania Railroad.

✦

W. E. Davis

William E. Davis, 67, prominent electrical engineer, died at Cleveland, Ohio, recently. He took a leading part in the building of street railway lines in Toronto, Canada, in the early 1890's and the Lake Shore Electric Railway, in Ohio. He became light and heat commissioner for Cleveland, and in 1923 was made chairman of the arbitration board, established to fix a rate between the municipally owned system and the Detroit United Railway covering terms for interurban cars to operate over the city tracks. For the past few years he has been consultant for the Cleveland Railway.

✦

W. S. Dimmock

W. S. Dimmock, Los Angeles, Cal., long active in the electric railway field, died recently in that city. Much of Mr. Dimmock's work had been done for Stone & Webster on their Pacific Coast properties, notably as manager of the Puget Sound Electric Railway, Pacific Traction Company and the Tacoma Railway & Power Company. Mr. Dimmock began his career in steam railroad work. After long service there he entered the electric railway business in 1892 as general manager of the Omaha & Council Bluffs Street Railway and the Omaha & Southern Railway. Later he served as general manager of the Richmond Passenger & Power Company, operating in Richmond and Petersburg, Va. It was from the Richmond properties that he went to the Pacific Coast for Stone & Webster and there became an important factor in the management of properties over which they exercised supervision. For them he continued in one capacity or another until 1910 when he was assigned to the company's Boston office. But the power of the Pacific to attract him remained unabated and he returned to the more equable climate of Southern California there to contemplate the passing show in leisure which he so well deserved.

✦

L. W. Miles

Lowell W. Miles, employment manager for the Interstate Public Service Company, Indiana Service Corporation and other co-ordinated utilities in Indiana under Insull management, died on Nov. 11.

Mr. Miles was born in Elwood, Ind., in 1898. After being graduated from Indiana University in 1922, he was associated in appraisal work for several years with Robert M. Feustel, a consulting engineer, now chief operating executive of the Insull companies in Indiana. He joined the Indiana Service Corporation at Fort Wayne in 1925 as manager of motor coach operations. In 1926 he was made statistician of the company and in August, 1929, he became employment manager of the co-ordinated companies at Indianapolis.

✦

H. R. Bowie

Hanson R. Bowie, auditor of the Penn-Ohio Transportation System, assistant general auditor of Ohio Edison and auditor of Pennsylvania Power Company, died recently.

Mr. Bowie was born in Uniontown, Pa., July 19, 1881. He went to Youngstown as assistant auditor of The Pennsylvania-Ohio Power & Light Company and associate companies, and was appointed auditor in April, 1928, on the resignation of F. E. Wilkin.

Throughout the period of the war, Mr. Bowie was in the cost accounting division of the Army Ordnance depart-

Digitized by Google

ment, being stationed at the Winchester Repeating Arms Company, New Haven, Conn., for the greater part of his service. Prior to the war he had been employed in the accounting departments of the Pacific Light & Power Company and the Southern California Edison Company. He was graduated from the Southwestern University of Southern California in accounting and commercial law.

✦

R. F. Clinch

R. Floyd Clinch, vice-president and a director of the Chicago, North Shore & Milwaukee Railroad and of the Chicago, Aurora & Elgin Railroad and a director of the Chicago Rapid Transit Company, died suddenly on Nov. 7 of heart disease.

In 1889 Mr. Clinch and the late John Crear organized the Crear-Clinch Coal Company, of which he was president at the time of his death. In addition to his electric railway affiliations, he was a director of the Central Trust Company, of Chicago; president of the Michigan Transit Company; of the Traverse City State Bank of Traverse City, Mich., and of the Hannah & Lay Mercantile Company; and receiver for the Chicago Auditorium Association.

Mr. Clinch was born in Georgia 65 years ago. He was educated in private schools in Georgia and later attended a military academy in Pennsylvania. He went to Chicago in 1883 and became associated with the Joliet Steel Company.

✦

T. Coleman du Pont

T. Coleman du Pont, former United States Senator from Delaware, banker, insurance man, powder manufacturer, coal miner, steel man, and street railway executive, died at Wilmington, Del., on Nov. 11. Mr. du Pont was a native of Louisville, where his family established some of the first street railways in Kentucky. Mr. du Pont was educated in Louisville schools, and at the Massachusetts Institute of Technology. His first business experience was in his father's coal mines at Central City, Ky., for the Central Coal & Iron Company, of which he later became president. In 1894 he went to Johnstown, Pa., and entered street railway work. At one time he was president of the railway in Johnstown, Pa., and controlled others in New York and New Jersey. Years ago he was instrumental in formation of the du Pont Manual Training High School in Louisville through a large donation.

✦

E. P. Charlton

E. P. Charlton, one of the original trustees of the Eastern Massachusetts Street Railway, to which post he was named by the Governor of Massachusetts in 1919, died on Nov. 20. Mr. Charlton was appointed to the board from Fall River, of which place he had long been a resident. There he served in banking, as a merchant and as a mill owner. It was his varied experience and his general appreciation of the needs of the territory served by the railway that led to his being named a railway trustee. He also served as a director of the New Haven Railroad. To industry he was, perhaps, best known as a vice-president of the F. W. Woolworth Company, with which the Charlton stores were combined in 1912. During the World War he served on the War Industries Board, at Washington, performing notable service. He later entered the War Department to aid in the purchase of supplies. He was a liberal contributor to charity.

Jacob Fishback

Jacob Fishback, 83 years old, who worked his way from a job as driver of a mule-drawn street car at Louisville, Ky., in 1869, to the position of assistant superintendent of transportation of the Louisville Railway, died on Nov. 10. He had been assistant superintendent since 1890.

Born in Somerset, Ky., Mr. Fishback received his education in the schools of Russell, Pulaski, Garrard, Boyle and Fayette Counties. He was early thrown on his own resources and worked in Lexington, Ky., for some years as a clerk. In 1869 he entered the employ of the Central Passenger Railroad in Louisville as a mule car driver. In 1872 he was made foreman of the carhouse and stables at Fifth and Oak Streets, and six years later was promoted to foreman of the railroad's carhouse at Eighteenth and Walnut Streets.

After the merger of the then existing railways of Louisville into the Louisville Railway Colonel Fishback was made assistant superintendent in charge of the car building and repair shops at Eighteenth and Walnut Streets. He was also made assistant superintendent of transportation at the same time.

✦

David W. Hennessey, general manager of the Ohio River Railway & Power Company, Pomeroy, Ohio, died at his home in Pomeroy on Nov. 18. He was 46 years of age.

Arthur W. Thompson

A. W. Thompson

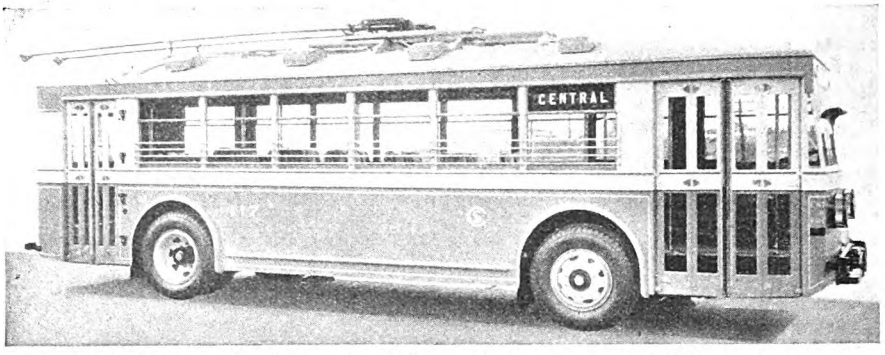
Arthur W. Thompson, former president of the United Gas Improvement Company and of the Pittsburgh Railways, died on Nov. 9. His service with the United Gas Improvement Company extended from Sept. 1, 1926, until January, 1929, when he retired owing to impaired health. After an extended trip abroad he established offices in Philadelphia as a consultant.

Following long and prominent serving in the steam railroad field, Mr. Thompson entered utility work where he became well known as a sturdy force in Pittsburgh after the war, serving as president of the Philadelphia Company in that city. It was he as his associates in the railway who convinced the many communities served by that company they could furnish all classes of common carrier transportation service. Not only that but they secured a new and favorable franchise and established a point of view on the part of the public toward the company that was a most notable achievement for co-ordinated transportation. It was these accomplishments among others which made it possible for the company to come within the requirements laid down by the Coffin foundation for that contest and to be returned the winner in 1925.

For more than fourteen years before that, the Pittsburgh Railways had been at odds with the city, during which seven separate and distinct reports had been presented. They involved more than $700,000, spent by the city, the Public Service Commission and the company to ascertain a valuation. All of this work was followed by a six-year receivership. Despite their heroic work, the receivers were unable to rehabilitate the company financially and were unable to finance the purchase of equipment or to improve the property except out of earnings. Finally the Pittsburgh Railways was turned back to the owners on petition of the city and the owners, to permit a trial operation of the new agreement. It was out of this chaos that Mr. Thompson and his associates lifted the Pittsburgh Railways to heights of accomplishments in the way of physical improvement, financial betterment and public relations which won for it the highest awards within the power of the industry to bestow. And at the convention of the association in 1925, Mr. Thompson, in accepting the award, graciously bestowed the credit for the accomplishments on his associates.

To those in the electric railway industry Mr. Thompson was best known by his work at Pittsburgh. To that work he brought the experience of a career which began as a rodman while he was still in college and culminated with him a vice-president of the B. & O. Railroad. Following his graduation from the civil engineering department at Allegheny College in 1897 he started as a draftsman with Wilkins & Davison at Pittsburgh and there served the hard school of railroad apprenticeship, being drafted from one important post to another until finally he became federal manager of several railroads during the war-time period. In his last post with the Baltimore & Ohio System he was in charge of operations, traffic, engineering and commercial developments. As chief engineer he supervised the expenditure of more than $1,000,000 per month in construction work over a long period. He had charge of the construction of the 6-mile $6,000,000 Magnolia cut-off, and while chief engineer of maintenance of way, he set a world record in the removal and replacement of bridges under traffic. These facts merely hint at the record of the man's accomplishments. They do not tell the full story. Mr. Thompson was born in Erie, Pa., on May 8, 1875.

Digitized by Google



Last eight Brill trolley buses placed in service have a reduced length but retain characteristic design and construction

Latest Brill Trolley Buses Delivered to Chicago

Since the Chicago Surface Lines started its program of trolley bus installations, 21 Brill trolley buses have been delivered. The last eight to be placed in service represent the latest 40-passenger type, which are shorter than their predecessors. The all-metal body was designed to combine profitable light weight with economical sturdiness. With the higher rates of acceleration, free running speed and consequently increased braking efficiency essential to trolley bus operation, the strain upon the construction, particularly in the roof and roof supports, is naturally greater. Much consideration has been given to the design of these parts and provision made to take care of it, resulting in the adoption of wide, substantial corner-pier construction.

In the underframe chassis, framing of ample strength and flexibility is furnished, while channel side and cross members provide adequate attachment for semi-elliptic springs, motor framing and other necessary equipment. Steel angle side sills, wood filled U-shaped pressed-steel side posts and carlines, side sheathing below the windows of No. 16 copper bearing steel securely riveted to adjacent members, No. 16 gauge pressed-steel letterboards and No. 18 gauge steel wheelhousings are the principal members of the body structure.

In the body of the Brill trolley bus streamline design is followed, placing emphasis upon attractive appearance in the interest of public appeal. Eight Brill exhaust ventilators, an adequately large ventilator under the metal sun visor over the windshield and two louvre type ventilators over the rear window supplement the raisable sash to the left of the operator. With the exception of windshield, adjoining wing sash, and that above the rear cross seat which are stationary, the windows are fitted with double sash, framed in tubular brass, the lower portion of which can be raised. The individual upper sash are stationary.

Inside the trolley bus, eleven Brill No. 306 semi-bucket type cove-back transverse seats with deep spring leather upholstered cushions, are provided together with longitudinal seats over wheelhousings and full width rear cross seat which also has semi-bucket cover type backs. For the operator, a Brill De Luxe 1001 seat, leather-upholstered, is adjustable both longitudinally and vertically to obtain maximum comfort for the operator. The Haskelite ceiling and inside finish, including side lining of plywood, are painted in harmony with the seat upholstery. Double coil cross-seat type electric heaters and cab heater located near the operator are also provided.

Double stream two-part folding doors for passenger entrance and exit at forward right-hand body corner are pneumatically controlled by the operator. Single stream double-folding exit doors on the right at rear are controlled by step treadle.

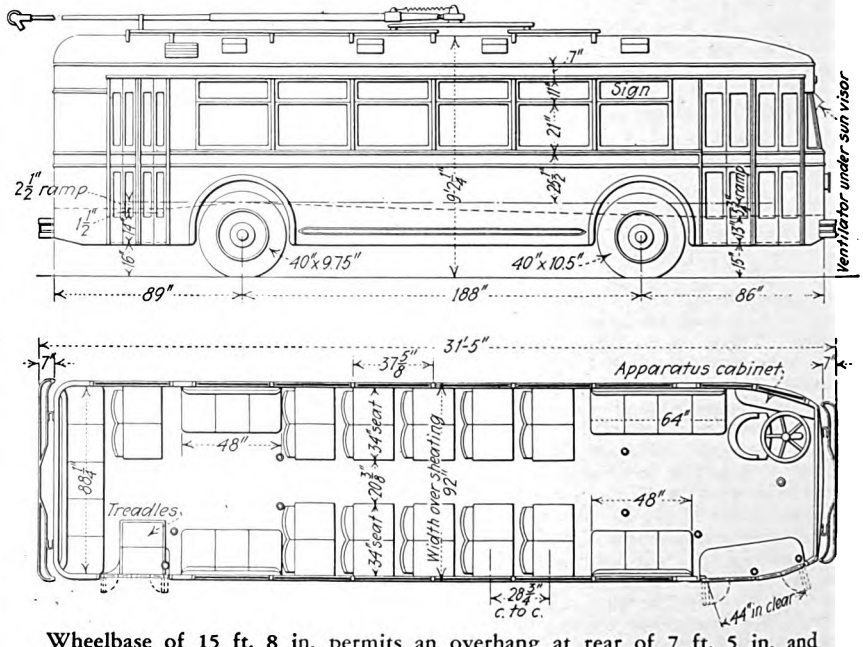
The rear axle of the Brill trolley bus is the standard Timken-Detroit dual worm Type No. 6536-W arranged for two motor drive, and the front axle is the Timken-Detroit one-piece forged axle No. 1669-W. Consequently the yellow pine floor, level at front platform, has a ramp back to wheelhousing from which point there is a 2-in. ramp downward to the rear.

A wheelbase of 15 ft. 8 in. is arranged to permit an overhang at rear of 7 ft. 5 in. and 7 ft. 2 in. at front. With the mounting of practically all equipment toward the rear and the long overhang at this point a load distribution of 40 per cent at front and 60 per cent at rear is obtained. The tire equipment consists of 40x9.75 dual tires at rear, and 40x10.5 single at front recommended by tire manufacturers for this type and weight of vehicle.

In the last eight trolley buses furnished to Chicago, the electrical equipment was furnished by the Westinghouse Electric & Manufacturing Company. Motors are two 50-hp., 600-volt Westinghouse 1426-CT-6 type. Control is the single-end automotive accelerating type, foot-pedal operation, with remote type control. The contactor box, reverser and other such equipment are housed in a noise-insulated compartment under the rear transverse seat. Access to this compartment is from the outside through an especially designed hinged door.

Completely equipped ready for operation the latest type Brill 40-passenger trolley bus furnished Chicago weighed 17,640 lb. and were equipped as follows:

Air brakes	Westinghouse DH-10
Axles	Timken-Detroit
Brakes	Timken four-wheel drum type
Bumpers	A. C. Co., spring steel
Buzzers	Consolidated Car Heating Co.
Car trimmings	Statuary bronze
Conduits and junction boxes	Flexible
Control	Westinghouse Type VA, single-end.
Registers	International R-10
Sash fixtures	Adams & Westlake, brass sash
Seats	Brill No. 306 semi-bucket type
Seating material	Leather
Springs	Detroit Steel Products Co.
Step treads	Kass safety
Tail lights	American Car Co.
Trolley retrievers	Ohio Brass Company
Destination signs	Hunter illuminated
Door operating mechanism	National Pneumatic Company
Hand brakes	Propeller shaft type
Heaters	Consolidated Car Heating Company
Headlights	Ohio Brass Company
Headlining	⅛-in. Haskelite
Motors	Two Westinghouse Type 1426-CT-6
Paint	Duco
Trolley base	Ohio Brass Company
Ventilators	Railway Utility Company
Wheels	Budd ventilated type
Speedometer	Stewart-Warner
Steering gear	Ross
Horn	Pneuphonic
Thermostat	Consolidated Car Heating Company



Wheelbase of 15 ft. 8 in. permits an overhang at rear of 7 ft. 5 in. and 7 ft. 2 in. at front

Digitized by Google

Extensive Car Replacements Needed

Recovery of the car building industry from the doldrums which have enveloped it for the past five years is inevitable, according to George Frey, vice-president of the J. G. Brill Company. Mr. Frey is not prepared to say when the recovery will begin, but he believes that the rail ways cannot delay making replacements much longer.

According to an interview with him in the *Philadelphia Record* he said that approximately 50 per cent of the street cars now in operation in the United States are hopelessly antiquated and many of them were built to conform to the needs and transportation theories of 25 years ago.

"Replacement of this out-of-date equipment," said Mr. Frey, "is imperative for railroads and street railway companies in order for them to compete with motor coaches and the private automobile. But they are deferring the placing of orders under a program of economy forced upon them by unfavorable circumstances. They cannot wait much longer." He listed high taxation, paving charges and politics among the circumstances holding back developments, all of which discourage financing projects.

Up to five years ago the 30-acre Brill plant in Philadelphia, according to Mr. Frey, produced an average of 3,000 cars a year and operated under the slogan of a car an hour. Since 1925, however, the output has dropped to an average of only 500 cars annually. The present industrial depression, he added, had little effect on street car building and had resulted in scarcely any curtailment on the Brill plant personnel.

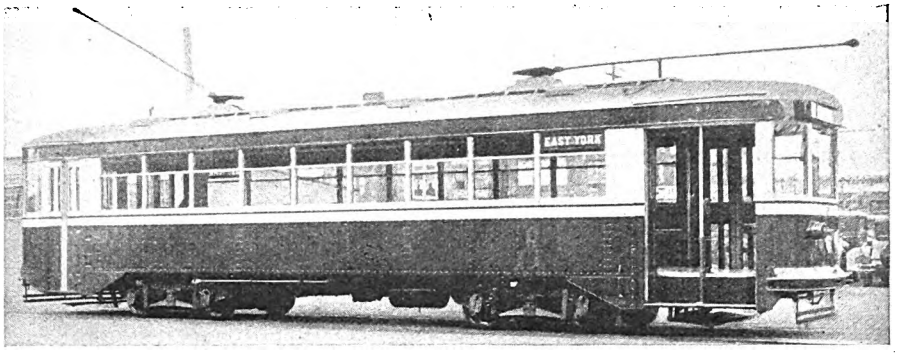
Mr. Frey believes that the electric trolley car operating on tracks is in no danger of becoming extinct despite the challenge of motor coaches, trolley buses and other forms of transportation. But the trolley of tomorrow will scarcely be recognized as a descendant of the old type car, bare and comfortless, still in use in many cities.

Luxury will be the keynote of the trolley of the future as it even now is beginning to be. Luxurious fittings, deep cushioned leather seats, designed for comfort and elegance will be enjoyed by the man riding to work. There will be linoleum on the floor and decorative effects throughout. Observation platforms have been planned on interurban lines. The death knell of the "Toonerville trolley" transportation has been definitely sounded.

Final Lot of Steel Motor Cars Delivered to L.I.R.R.

Thirteen new steel motor cars, the last of the final installment of 85, have been delivered to and placed in service by the Long Island Railroad. This increase in passenger equipment has been obtained at an approximate cost of $3,000,000. It has also been necessary to appropriate a further sum of approximately $1,500,000 for the erection of nine substations and the extension of transmission lines, in order to take care of the power requirements of this additional rolling stock.

The new equipment includes roller bearing trucks, automatic door and train control, improved interior lighting arrangement, automatic ventilators, higher powered headlights and windshield wipers on motorman's cab window. The Long Island Railroad now has a total of 1,438 passenger cars, all of steel construction.



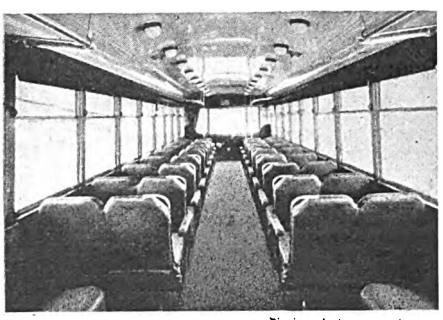
New one-man car recently placed in service by the York Railways

York Railways Accept Delivery of Three New Cars

York Railways, York, Pa., has recently placed in service three one-man, city type cars delivered by the J. G. Brill Company. The cars have a seating capacity of 50 passengers and are equipped with folding doors at the ends.

Detailed specifications are as follows:

Name of railway	York Railways, York, Pa.
Number of units	3
Type of unit	One-man, motor, passenger, city, double end, double truck
Number of seats	50
Builder of car body	J. G. Brill Co., Philadelphia, Pa.
Date of order	5/27/30
Date of delivery	10/27/30
Weights: Car body	17,350 lb.
Trucks	13,550 lb.
Equipment	2,700 lb.
Total	33,600 lb.
Bolster centers	19 ft. 10 in.
Length over-all	43 ft. 3 in.
Length over body posts	29 ft. 10 in.
Truck wheelbase	4 ft. 10 in.
Width over-all	8 ft. 5½ in.
Height, rail to trolley base	10 ft. 5 7/8 in.
Body	All steel
Roof	Arch
Doors	End
Air brakes	General Electric straight
Armature bearings	Plain
Axles	ASTM—A-20-27 annealed
Car signal system	Faraday
Compressors	General Electric Co. CP-27-B
Conduit	Flexible
Control	Type K
Couplers	Portable bar
Curtain fixtures	XL-80
Curtain material	Pantasote No. 86, Green "K" Morocco
Destination signs	Keystone
Door mechanism	National Pneumatic Co.
Doors	Folding
Energy saving device	Economy watt hour meter
Finish	Keeler & Long
Floor covering	Armstrong linoleum
Gears and pinions	Tool Steel Gear & Pinion Co.
Glass	Plate, upper doors D. A.; lower doors, clear wire
Hand brakes	Peacock staffless
Heaters	Consolidated
Headlights	Electric Service Supplies Co. FH-916
Headlining	Agasote
Interior trim	Bronze, statuary finish
Journal bearings	Plain
Journal boxes	Brill semi-steel
Lamp fixtures	Electric Service Supplies Co.
Motors	Four GE-264-F, inside hung
Painting scheme	Orange, cream and maroon
Registers	International R-12 and R-8
Roof material	¼" tongue-and-grooved, poplar
Safety car devices	LB-4 control
Sash fixtures	O. M. Edwards brass
Seats	Brill 201-E
Seat spacing	31 in.
Slack adjusters	Brill mechanical
Steps	Stationary
Step treads	Kass
Trolley retrievers	Earll standard
Trolley base	US-20
Trolley wheels	General Electric Co.
Trucks	Brill 84-E-1-X
Ventilators	Brill square type exhaust
Wheels	Davis cast steel, diameter 26 in.
Wheelguards	H-B



Interior seating arrangement for 50-passenger capacity

English Railway Places Large Order for Electrical Equipment

Orders amounting to nearly £500,000 have been placed by the Southern Railway of England with two British firms for the electrical equipment of trains to be operated on the extension of the electrified system to Reigate, Brighton and Worthing and also for such additional trains to be provided to meet increasing passenger traffic in the London suburban areas. The orders were placed with the Metropolitan-Vickers Electrical Company, and the British Thomson-Houston Company. Electrical equipment has been ordered for 23 six-car and three five-car motor units for the trains on the Brighton line; 40 four-car motor units for the trains on the semi-fast system to Reigate, Brighton and Worthing, and twelve three-car motor units and six two-car trailer units for the additional rolling stock on suburban service. The car bodies will be built in the work shops of the Southern Railway.

30,000,000 Tons of Scrap used by Steel and Iron Industry

According to the first survey ever made of the consumption of scrap iron and steel, nearly 30,000,000 gross tons were used in 1929 in the iron and steel industry, announces Benjamin Schwartz, director general of the Institute of Scrap Iron & Steel, Inc. Of this amount about 5/6 was converted into steel ingots; the iron industry used the rest. The survey reveals also that the trend of the steel industry is toward processes that require a large scrap tonnage, according to Mr. Schwartz. At the present time the average consumption of companies that do not employ the Bessemer process is 55 per cent scrap and 45 per cent pig iron.

Eccles & Davies Machinery Company, Inc., Los Angeles, Cal., have been appointed agents for the Hollup Corporation, Chicago, Ill., manufacturers of Hollup welders and Hollup welding rods for all purposes. Stocks will be moved from the East in carload lots to California for the purpose of giving patrons the benefit of lowest possible prices.

Digitized by Google

BUS DELIVERIES

British Columbia Electric Company, Vancouver, B. C., two White Model 613.

City of Detroit, Department of Street Railways, 50 A.C.F., all-steel 40-passenger gas-electric Metropolitan type.

Denver Tramway, Denver, Col., one Mack Model BC, 29-passenger city type.

Illinois Power & Light Corporation, Chicago, Ill., ten Mack Model BC, 29-passenger city type.

Louisiana Power & Light Company, Algiers, La., five White Model 165A.

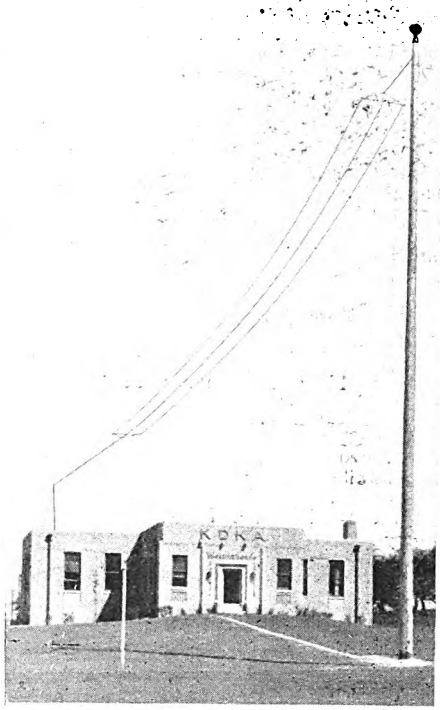
West Penn Electric Company, Pittsburgh, Pa., one White Model 54.

KDKA Celebrates Tenth Anniversary

With a special anniversary program at a dinner of the Pittsburgh Chamber of Commerce attended by many radio notables and leaders of industry, the tenth anniversary of broadcasting by Westinghouse radio station KDKA, pioneer broadcasting station, was observed recently. The anniversary program was broadcast over both KDKA and its short wave station W8XK.

Since the election of Warren G. Harding as president of the United States was broadcast Tuesday night, Nov. 2, 1920, the pioneer station of the world has not missed a single day of broadcasting. Since that first prescheduled program proved so successful, the radio industry has set a new record for progress and development.

From the modest experimental stations 2WE and 2WM, one of which was at the home of Dr. Frank Conrad, who broadcast entertainment programs each Saturday night, Westinghouse has kept pace with the remarkable progress of radio broadcasting by the construction of the new 400,000-watt transmitter at Saxonburg. This giant station required the solution of many engineering problems before it was ready to broadcast programs from the William Penn Hotel studios of KDKA, 30 miles away.



The site of the KDKA station at Saxonburg occupies 130 acres

Electric Railway Material Prices—December 1, 1930

Metals—New York

Copper, electrolytic, delivered, cents per lb.	11.00
Lead, cents per lb.	5.10
Nickel, ingot, cents per lb.	35.00
Zinc, cents per lb.	4.11
Tin, Straits, cents per lb.	26.14
Aluminum, 98 to 99 per cent, cents per lb.	22.90
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	35.00
General service	30.00

Bituminous Coal

Pittsburgh mine run, net ton	$1.40
Central, Ill., screenings	0.70
Kansas screenings, Kansas City	1.50
Big Seam, Ala., mine run	1.50
Smokeless mine run, Chicago	2.05

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Track spikes, $\frac{5}{8}$-in. and larger, per 100 lb.	2.80
Tie plates, cents per 100 lb.	2.075
Angle bars, cents per 100 lb.	2.75
Track bolts, per 100 lb.	3.90
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	1.35

Hardware—Pittsburgh

Wire nails, per keg	$1.95
Sheet iron (24 gage), cents per lb.	2.35
Sheet iron, galvanized (24 gage), cents per lb.	2.95
Auto body sheets (20 gage), cents per lb.	3.40

Waste—New York

Waste, wool, cents per lb.	12.00 to 15.00
Waste, cotton (100 lb. bale), cents per lb.:	
White	9.00 to 13.00
Colored	5.00 to 7.00

Paint Materials—New York

Linseed oil (5 bbl. lots), cents per lb.	10.00
White lead in oil (100 lb. keg), cents per lb.	13.75
Turpentine (bbl. lots), per gal.	0.48
Putty, 100 lb. tins, cents per lb.	5.50

Wire—New York

Bare copper wire, cents per lb	13.25
Rubber-covered wire, No. 14, per 1,000 ft.	5.65
Weatherproof wire base, cents per lb.	14.6

Paving Materials

Paving stone, granite, 5 in., f.o.b.: New York—Grade 1, per thousand	$150.00
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd., f.o.b.	2.50
Paving brick 3½x8½x4, N. Y., per 1,000 in. carload lots, f.o.b.	50.00
Paving brick, 3x8½x4, N. Y., per 1,000 in. carload lots, f.o.b.	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd., delivered	3.40
Cement, Chicago, in carload lots, without bags, f.o.b.	1.95
Gravel, ¾-in., cu.yd., delivered New York	3.40
Sand, cu.yd., delivered New York	2.15
Asphalt (Texas), in package, N. Y., per ton	22.50

Scrap Metal—New York

Heavy copper, cents per lb.	8.50
Light copper, cents per lb.	7.75
Heavy yellow brass, cents per lb.	5.25
Zinc, old scrap, cents per lb.	2.00
Lead, heavy, cents per lb.	4.25
Mixed babbit, cents per lb.	4.50
Battery lead plates, cents per lb.	2.13

Old Material—Chicago

Steel car axles, net ton	$13.25
Cast iron car wheels, gross ton	12.00
Steel car wheels, gross ton	13.75
Leaf springs, cut apart, gross ton	13.75
Angle bars, gross ton	12.25
Brake shoes, net ton	7.50
Rails (short), gross ton	12.75
Rails (relaying), gross ton (65 lb. and heavier)	28.50
Machine shop turnings, gross ton	5.00

TRADE NOTES

J. H. Williams & Company, manufacturers of drop forgings and drop-forged tools, have just closed contracts for an addition to their plant at Buffalo, N. Y. The extension will provide an increase of approximately 30,000 sq.ft. in floor space, to be used for additional heat-treating facilities and for finishing, assembling and storage of stock products.

Maj. Walter C. Sanders, U. S. Army Reserve Corps, was ordered to active duty in Washington, D. C., from Nov. 9 to Nov. 22, where he was assigned to the office of the Assistant Secretary of War to study War Department transportation problems. Major Sanders is general manager of the railway division of the Timken Roller Bearing Company.

Southern Tractor Supply Company, 406 Geer Building, Durham, N. C., has been appointed exclusive representative for the sale of Amsco tractor links and sprockets in the District of Columbia, North Carolina, South Carolina, Eastern Tennessee, Virginia and West Virginia.

Okonite Company announces the appointment of J. E. Harrall as sales representative to the light and power industry in the district which centers around Philadelphia. Mr. Harrall was formerly district sales manager of Safety Cable Company, division of General Cable Corporation with headquarters in Philadelphia. W. R. Van Steenburgh has been appointed manager of the light and power department of the New York office territory. Mr. Van Steenburgh will direct sales and engineering activities in New York, New Jersey, Pennsylvania, Delaware, Maryland, West Virginia and the District of Columbia.

Westinghouse Completes New Subway Order

Final shipment has just been made by the Westinghouse Electric & Manufacturing Company on the largest contract for subway control ever awarded. This order included 300 sets of controls for the Eighth Avenue subway in New York. Shipment was made to the Board of Transportation of New York City. Electrical equipment for the contract also includes 610 motors of 190 hp. each. The last of these power units will have been shipped by Westinghouse by the end of the year.

Old Generator Finds a Haven in the Franklin Institute

After many years of satisfactory and continuous service in various locations of the Philadelphia Rapid Transit Company, an electric generator has come to the end of the trail in the Museum of Electricity of the Franklin Institute, Philadelphia. The machine was sought by the Ford Museum in Dearborn, but there was a natural wish to keep the generator in Philadelphia. The machine was manufactured by the General Electric Company, and shipped to the World's Fair in Chicago in 1893, where it was acquired by the P.R.T. The generator was first used as a light generator in the Sutherland Avenue Power Station, the first electric railway generating station in Philadelphia.

Digitized by Google

SR 101 Transportation

ELECTRIC RAILWAY JOURNAL

REC'D DEC 1930 E.R. DEPT.

Graw-Hill Publishing Company, Inc. DECEMBER, 1930 Thirty-five Cents per Copy

TIMKEN BEARING EQUIPPED

Timken-Equipped Cars Handle Peak Loads with Peak Profits

VOLUME of traffic doesn't mean anything unless handled at a cost that represents maximum profit per car.

The greater the loads, the greater is the necessity for Timken friction-elimination, power conservation and lubricant saving.

Electric car companies have found in modern Timken-equipped cars, the secret of profitable operation under modern competitive conditions.

It isn't only a matter of reduced car mile running costs. Maintenance costs are also slashed to the bone by Timken capacity to carry all loads—radial, thrust or both at once—thus increasing endurance and extending car life.

Every modern anti-friction necessity is contained in the exclusive combination of Timken tapered construction, Timken positively aligned rolls and Timken-made steel. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN
Tapered
ROLLER BEARINGS

Digitized by Google

14 YEARS' SUCCESSFUL OPERATION

----the basis of repeat orders

IN 1916 and 1917, the Salt Lake and Utah Railroad placed in service its first two Baldwin-Westinghouse locomotives. In 1920, three similar standard Baldwin-Westinghouse locomotives were added to its rolling stock. And now, after many years of successful operation, another has been added, bringing the total to six—all standard Baldwin-Westinghouse locomotives, operating in regular revenue service.

Of particular interest about the latest locomotive is the "clear view" feature. All equipment within the cab is kept below the direct line of vision of the operator thus affording him a perfect view—a necessary requisite of safety.

Baldwin-Westinghouse locomotives all over the country are attracting new business by furnishing reliable and speedy freight movement. Write either company for full particulars about standard Baldwin-Westinghouse electric locomotives.

A standard Baldwin-Westinghouse Locomotive recently delivered to the Salt Lake & Utah Railroad.

The Baldwin Loco. Works, Philadelphia, Pa.—Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

Baldwin-Westinghouse

T 31628

TUNE IN THE WESTINGHOUSE SALUTE OVER THE N. B. C. NATION-WIDE NETWORK EVERY TUESDAY EVENING.

Digitized by Google

Electric Railway Journal

MORRIS BUCK
Engineering Editor
GEORGE J. MACMURRAY
CLIFFORD A. FAUST
J. W. MCCLOY
JOSEPH R. STAUFFER

Consolidation of
Street Railway Journal and Electric Railway Review

JOHN A. MILLER, JR., *Editor*

Vol. 74, No. 13 *Pages 729-786*

PAUL WOOTON
Washington
W. C. HESTON
Pacific Coast Editor
ALEX MCCALLUM
London, England
LOUIS F. STOLL
Publishing Director

Facts and Figures!

Progress during the year 1930 and what the electric railway industry hopes to do next year will be told in the JOURNAL's Annual Statistical and Progress Number.

An indispensable source of data for everyone interested in public transportation.

It will appear early in January.

McGraw-Hill Publishing Company, Inc.

Tenth Avenue at 36th Street
New York, N. Y.

CABLE ADDRESS:
"MACHINIST, N. Y."

JAMES H. MCGRAW, *Chairman of the Board*
MALCOLM MUIR, *President*
JAMES H. MCGRAW, JR., *Vice-President and Treasurer*
EDWARD J. MEHREN, *Vice-President*
MASON BRITTON, *Vice-President*
EDGAR KOBAK, *Vice-President*
HAROLD W. MCGRAW, *Vice-President*
H. C. PARMELEE, *Editorial Director*
C. H. THOMPSON, *Secretary*

Member A.B.C.
Member A.B.P.

1930

Official correspondent in the United States for Union International de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles.

NEW YORK, *District Office, 285 Madison Avenue*
WASHINGTON, *National Press Building*
CHICAGO, *520 North Michigan Avenue*
PHILADELPHIA, *1600 Arch Street*
CLEVELAND, *501 Guardian Building*
BOSTON, *1427 Statler Building*
GREENVILLE, S. C., *1301 Woodside Building*
DETROIT, *2-257 General Motors Building*
ST. LOUIS, *1556 Bell Telephone Building*
SAN FRANCISCO, *883 Mission Street*
LOS ANGELES, *632 Chamber of Commerce Bldg.*
LONDON, *6 Bouverie Street, London, E. C. 4*

Published monthly, with one additional Convention Number during the year. $3 per year. 35 cents per copy. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

Contents of This Issue

DECEMBER, 1930

Copyright, 1930, by McGraw-Hill Publishing Company, Inc.

Editorials 729

Research Department Aids Railway Operations 732

Knoxville Trolley Buses Increase Patronage 735

Extensive Rehabilitation Places Des Moines in Favorable Position 736
By LAURENCE WINGERTER

Higher Revenues with Lower Fares 739

Philadelphia Sample Car Uses Single-Reduction Drive with High-Speed Motors and Magnetic Brakes 741

Washington Experiments with Street Markers 742

Co-ordination of Transit Facilities Proposed for St. Louis 743

Development of the Bus for Mass Transportation 745
By A. T. WARNER

Reliability Features Reading's Power Supply 747
By C. L. DOUB

More Power 750
By J. W. WELSH

Pittsburgh Traffic Signal Controlled by Street Car Movement 752

Trolley Bus Operation Proves Advantageous at Detroit 753

Heating Passenger Trains on Electrified Steam Railroads 755

Richey Fare Index Revised 756

Regenerative Equipment Planned for Paris Tramcars 757

Monthly and Other Financial Reports 760

A.E.R.A. Executive Committee Meets in New York 761

Cleaning Cars and Equipment by Sand Blast 762

Maintenance Notes:

Insulation Tested with Portable Transformer—*By A. Taurman* 763

Bus Wheels Removed with a Simple Clamp—*By C. B. Hall* 763

Pump and Heater Facilitate Transmission Filling—*By Leonard S. Rose* 764

Radio Interference from Cars Eliminated by Choke Coil—*By A. S. Warner* 764

Work Car Equipped to Spread Material Along Track 765

Remodeling Cars for One-Man Operation 765

Testing Air Governors—*By E. S. McGinnis* 766

Insulating Paste for Bolt Heads—*By E. V. Lackey* 766

Economical Rerailing at Atlanta—*By D. S. Berman* 766

New Products for the Railways' Use 767

News of the Industry 771

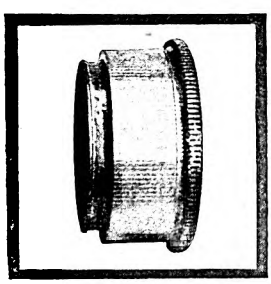
Digitized by Google

QUANTITY *production* makes QUALITY *practical*

PRESERVE

the thoroughbred strain *with Westinghouse Renewal Parts . . .*

WHEN you chose Westinghouse equipment you picked a thoroughbred. When you make replacements with renewal parts manufactured outside the Westinghouse walls you are weakening the thoroughbred strain. Regardless of the quality of the material and the careful design that go into the construction of the renewal part, if the work is done without the original drawings, specifications, and tools, a perfect reproduction can hardly be expected. The piece may *work* but, after all, almost any horse can run—it took generations of careful breeding to produce a Man-o-war.



The Westinghouse Renewal Parts Plant at Homewood, Pa., is under the direction of an engineering group of specialists whose facilities are devoted to the study and manufacture of renewal parts.

Let the same logical thinking that led you to buy superior equipment, be your guide in making this important decision, when purchasing your renewal parts.

Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse T 31547

WESTINGHOUSE ELECTRIC

TUNE IN THE WESTINGHOUSE SALUTE OVER THE N. B. C. NATION-WIDE NETWORK EVERY TUESDAY EVENING.

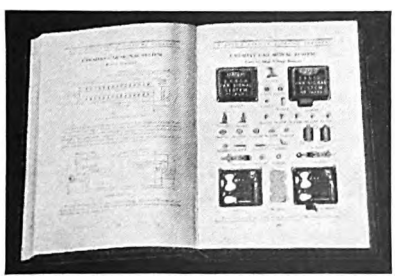
Digitized by Google

Why not order *all* car equipment from *one* dependable source?

Keystone electric railway car equipment is installed on the finest of modern cars. A representative car is Keystone-equipped throughout, from trolley wheel to the Golden Glow Headlight on the front end. Keystone specialties include gear-cases, trolley poles and cords, trolley catchers, lighting fixtures, signal systems, alarms, fare registers, etc., etc.

The best way to order is from our *687-page* catalog of car equipment. We'll be glad to send copies to buyers and executives. *Ask for catalog No. 7.*

A great deal of effort was put behind the publication of Catalog No. 7, in order that you would have first-hand information on all equipment and parts. Since the publication of this catalog a number of supplementary sheets have been issued listing particularly the new interior lighting fixtures. We will be glad to send these to you upon request.

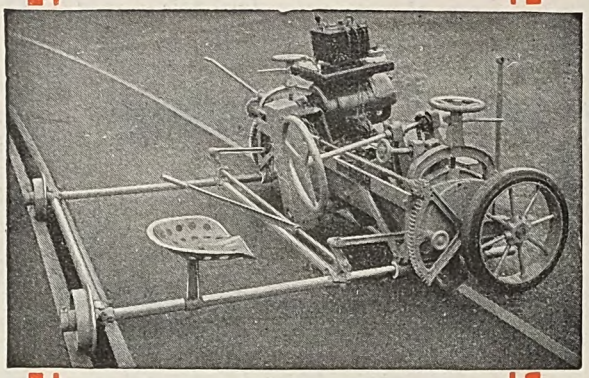


ELECTRIC SERVICE SUPPLIES CO. Manufacturer

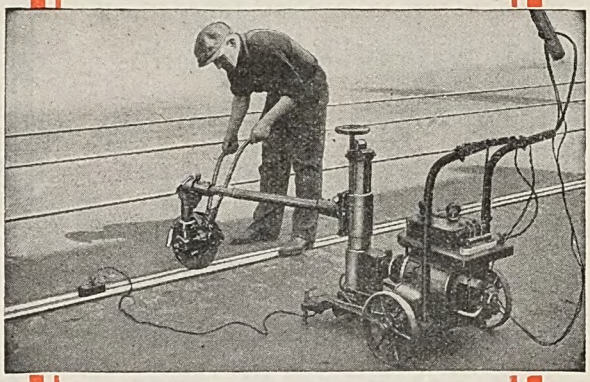
RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL

Home office and plant at 17th and Cambria Sts., PHILADELPHIA; District offices a. 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube and Supply Company, Ltd., Montreal, Toronto, Vancouver.

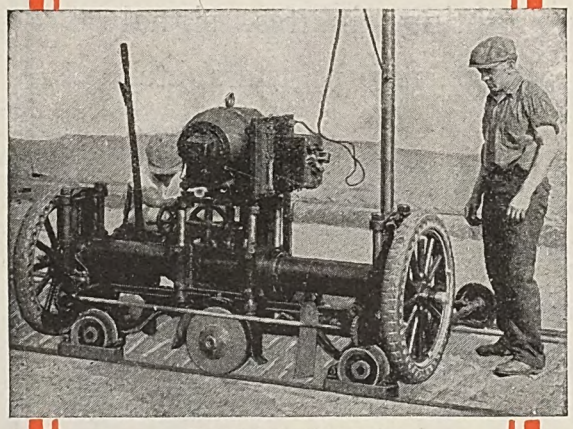
Digitized by Google



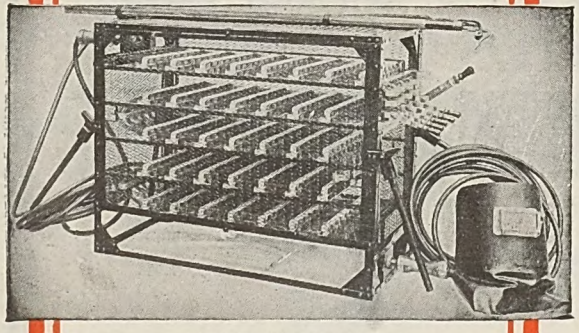
Improved Atlas Rail Grinder



Eureka Radial Rail Grinder



Imperial Track Grinder



Ajax Electric Arc Welder

Old-time roads cannot carry new-day traffic

Digitized by Google

Yesterday's highways couldn't carry to-day's motor cars, but yesterday's rails can carry to-day's street cars.

It's much easier and cheaper to restore the youth of old rail than to rejuvenate an obsolete highway.

All that's needed is suitable modern equipment—such as the rail grinders and arc welders here displayed for your selection.

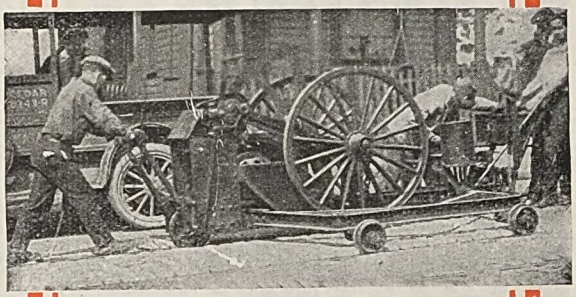
Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

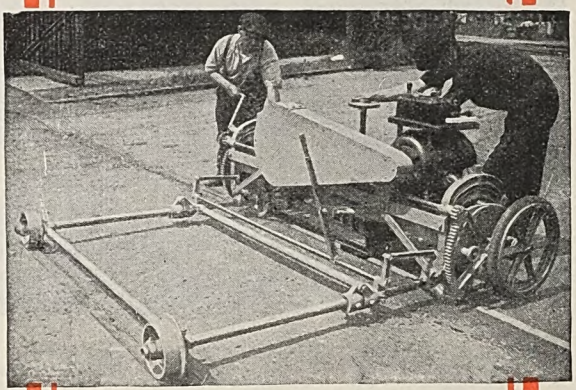
AGENTS

Chester F. Gailor, 50 Church St., New York
Chas. N. Wood Co., Boston
H. F. McDermott, 208 S. LaSalle St., Chicago
F. F. Bodler, San Francisco, Cal.
H. E. Burns Co., Pittsburgh, Pa.
Equipment & Engineering Co., London

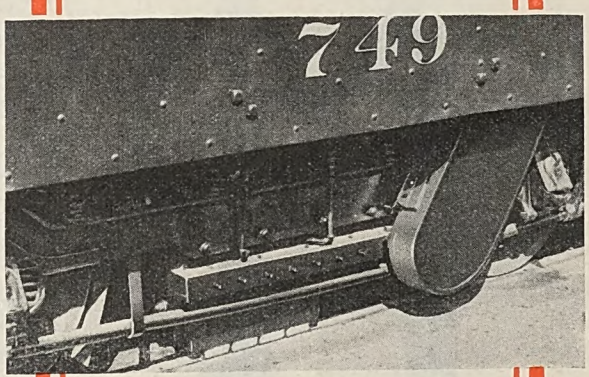
3571



Reciprocating Track Grinder



Vulcan Rail Grinder

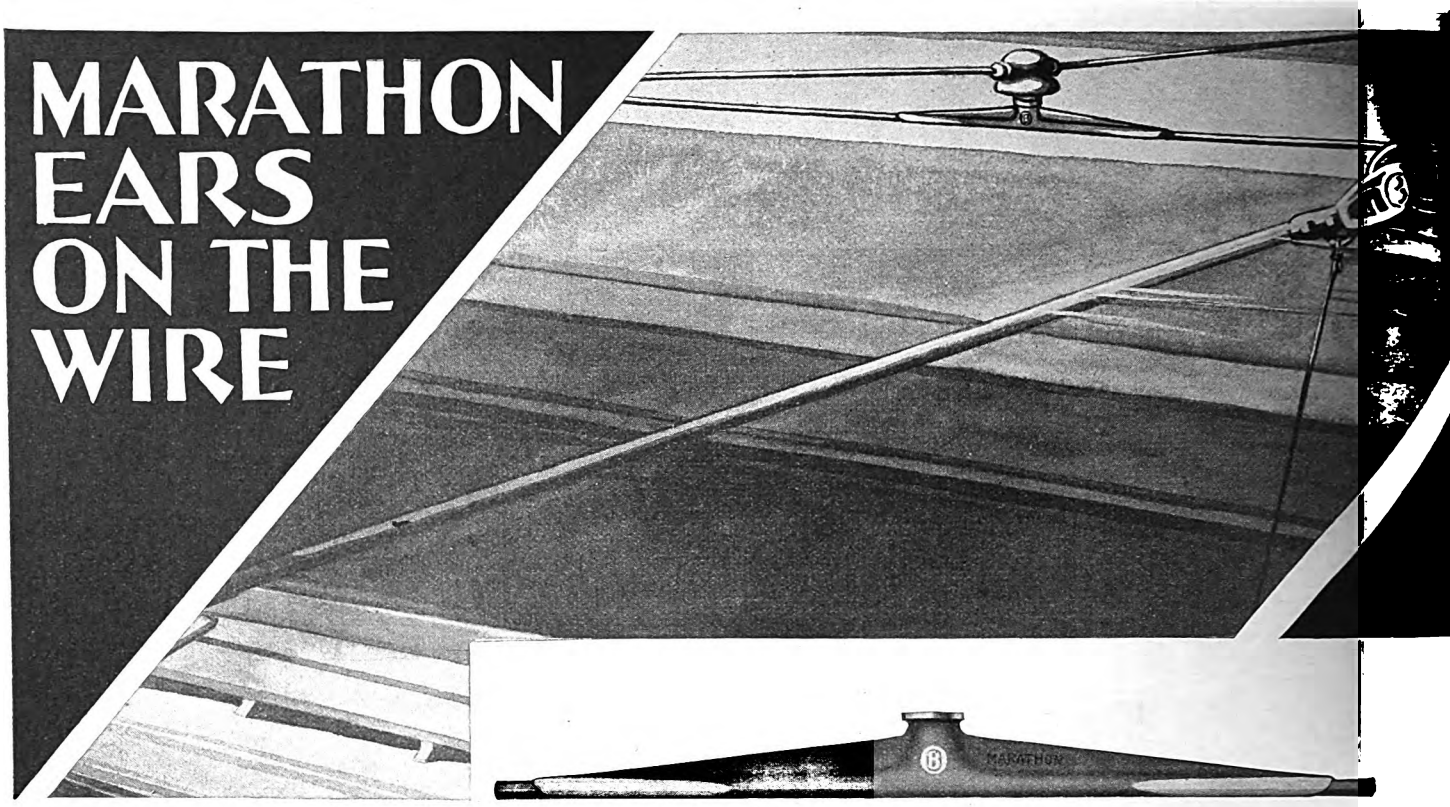


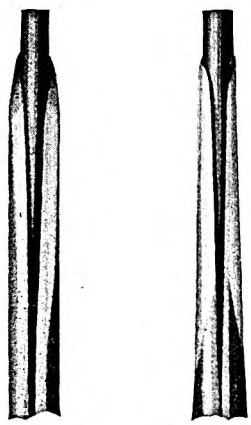
Reciprocating Grinder Car, showing one of the grinding units.

RTW Curve Oiler

Digitized by Google

MARATHON EARS ON THE WIRE





The Old Type Ear **The *Improved* Marathon Ear**

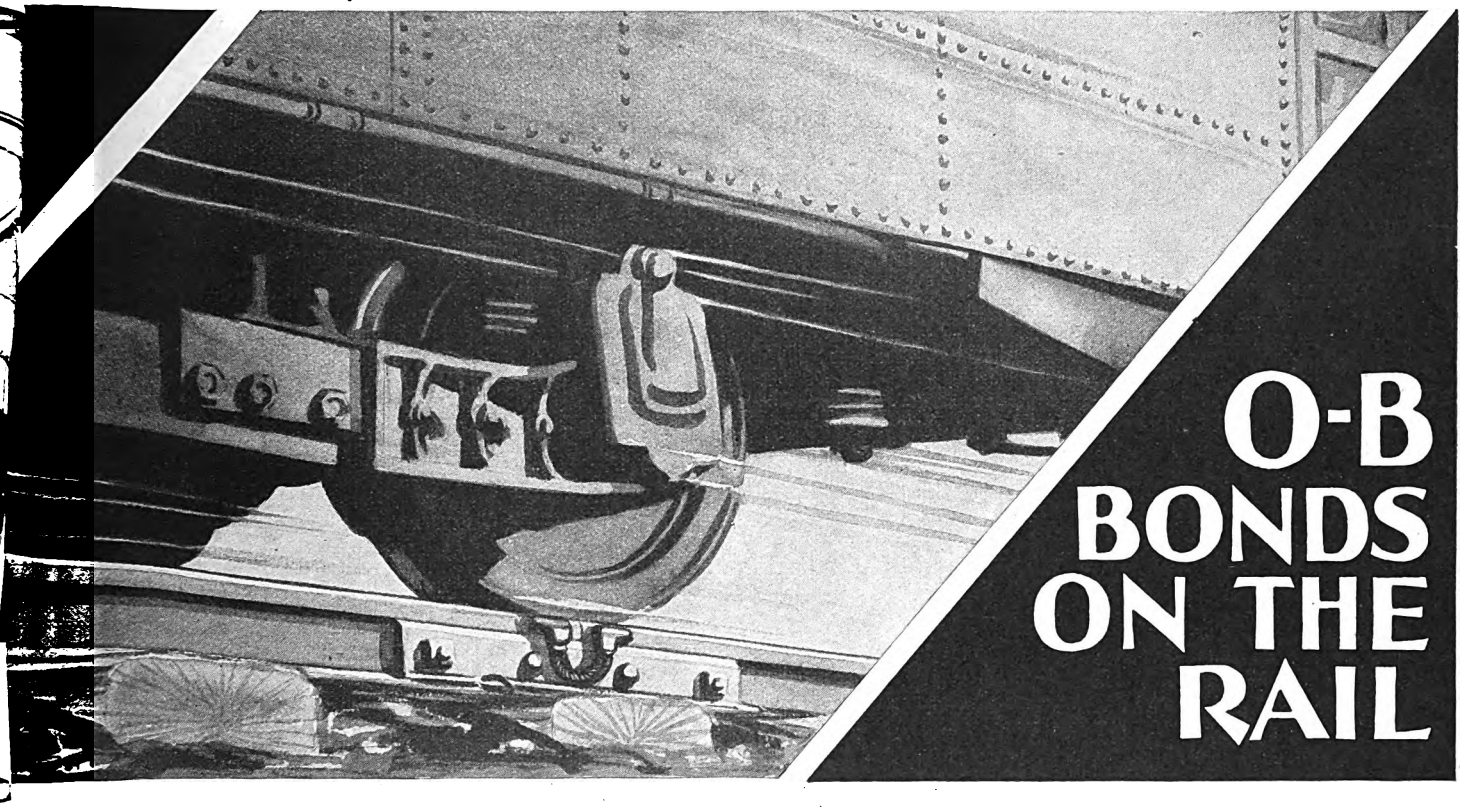
These sections of ends tell the story. The abrupt approach and leave has given way to the taper with the result that the wheel passes smoothly and steadily across the ear without bumping, bouncing or arcing.

THE introduction of the *improved* Marathon Ear three months ago has awakened a most active interest among electric railway men. Never has O-B introduced a new product which received any greater evidence of approval—not even excepting the exceedingly popular original Marathon Ear, introduced in 1923.

One Missouri property changes from its customary brand and orders four hundred *improved* Marathons; a large property in Alabama recognizes the advantages of the tapered approach and orders one thousand *improved* Marathons; a Canadian property foresees the reduced wear on ears, wire and wheels and orders fifteen hundred *improved* Marathons; two Pennsylvania properties send in large orders based on the obvious excellence of *improved* Marathons. Concrete evidence comes from scores of properties that *improved* Marathon Ears have "taken".

An early investigation on your part might properly lead to the conclusion that *improved* Marathon Ears will likewise reduce costs on your property. Ask your O-B Salesman, or see page 44 of New Products Supplement No. 4 to O-B Catalog No. 20 for complete description and ordering information.

Digitized by Google



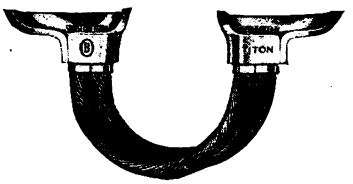
O-B BONDS ON THE RAIL

AMONG the most important of the recent rehabilitation programs to be completed is that of the Windsor, Essex & Lake Shore Electric Railway. This property extends from Windsor to Leamington, Ontario—a distance of thirty-six miles—and is operated by the Hydro Electric Power Commission of Ontario. Complete rehabilitation of track, overhead and rolling stock has been effected, with a resultant increase in operating efficiency.

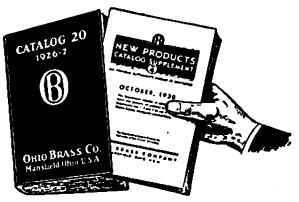
Indicative of the operator's efforts to keep operation and maintenance costs at a minimum was their selection and use of 13,000 O-B Titon Rail Bonds. This choice was made after exhaustive service tests and was influenced somewhat by the excellent performance records of Titon Bonds on many other properties.

O-B Titon Bonds are installed by copper electrode arc welding and are applied to the head of the rail with O-B Duron Welding Rod. A copper sleeve, which distributes and dampens out vibrations and adds to the life of the bond, surrounds the wire inside the terminals. The design of the terminals permits beveling of deposited metal from the rail so as to escape wheel contact. Thus is the service life of the bond materially lengthened.

O-B Titon Bonds are fully described on page 667 of O-B Catalog No. 20. Other types of O-B Bonds will be found in the same section.



The O-B Titon Bond, showing terminal construction. Note copper sleeves surrounding strand ends inside of terminal.



Twenty-four pages of New Products Supplement No. 4 to O-B Catalog No. 20 are allotted to bonds and bonding equipment. If you do not have a copy, write for one.

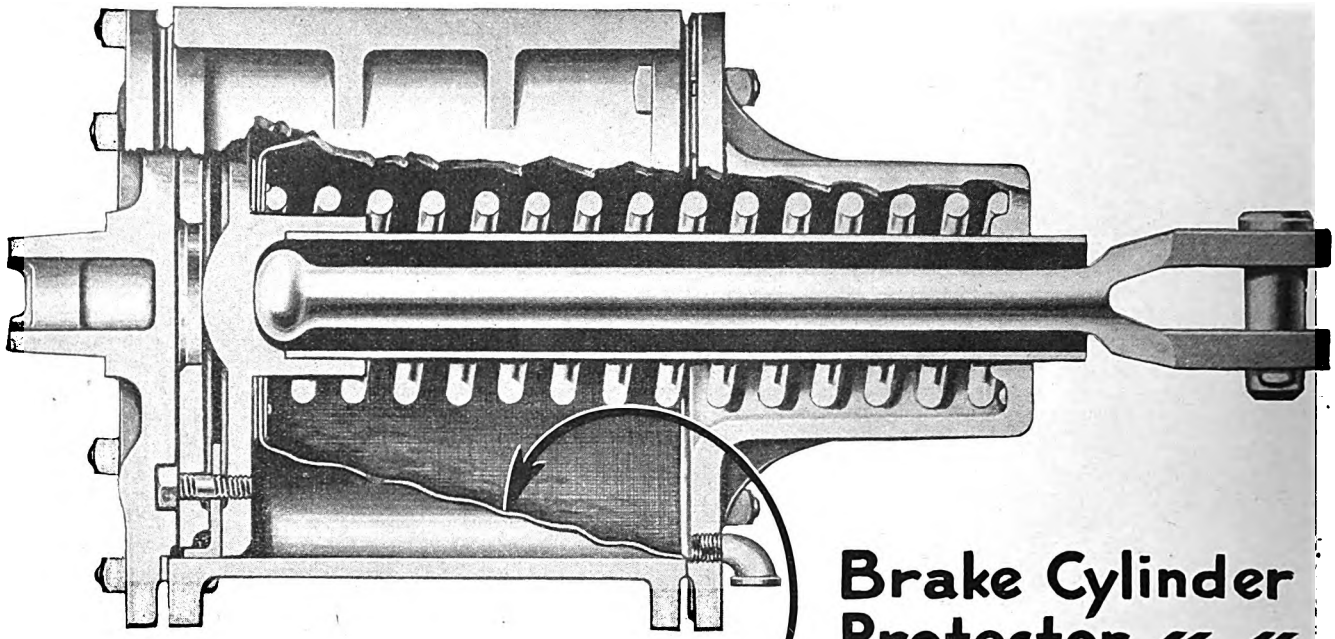
Ohio Brass Company, Mansfield, Ohio
Canadian Ohio Brass Company, Limited
Niagara Falls, Canada
1332BL

Ohio Brass Co.

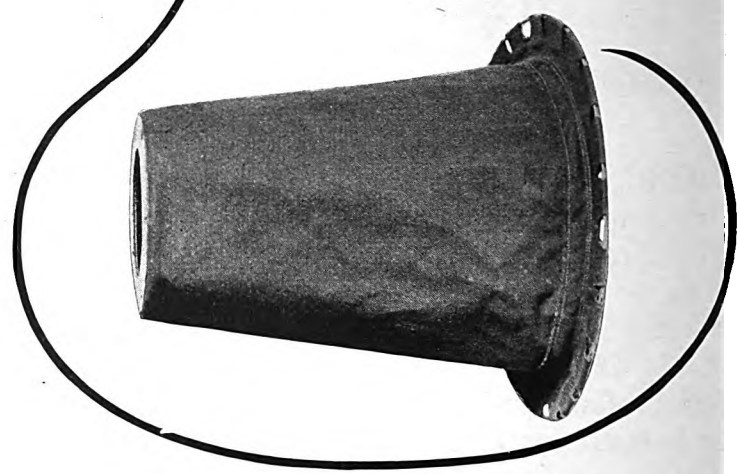
NEW YORK PITTSBURGH CHICAGO CLEVELAND ST. LOUIS ATLANTA DALLAS
PHILADELPHIA BOSTON LOS ANGELES SAN FRANCISCO SEATTLE

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Digitized by Google



Brake Cylinder Protector « «



A TRAP for Destructive DIRT « «

THIS protector—a collapsible water-proof hood—when inserted in the brake cylinder as shown, traps dirt and moisture that may enter at the non-pressure head, and prevents them from reaching the cylinder walls » » The advantages of this protection are that the lubricant is preserved, leakage reduced, life of packing cup lengthened, and maintenance expense lessened » » ***Are your brake cylinders thus protected?***

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works

WILMERDING PENNSYLVANIA

Digitized by Google

Digitized by Google

SITTING STILL IS PROFITABLE

Most people picture hustle and bustle when thinking of a profitable business. But the restful, still-sitting passenger certainly leads to a profitable operation for the electric railway. In your own advertising (if you are not already doing so) call the passengers' attention to the rest and ease found in your seats. And be sure to provide that comfort by installing Hale & Kilburn equipment.

Another variation of the Hale & Kilburn No. 909 seat for single end cars or motor buses.

HALE & KILBURN SEATS

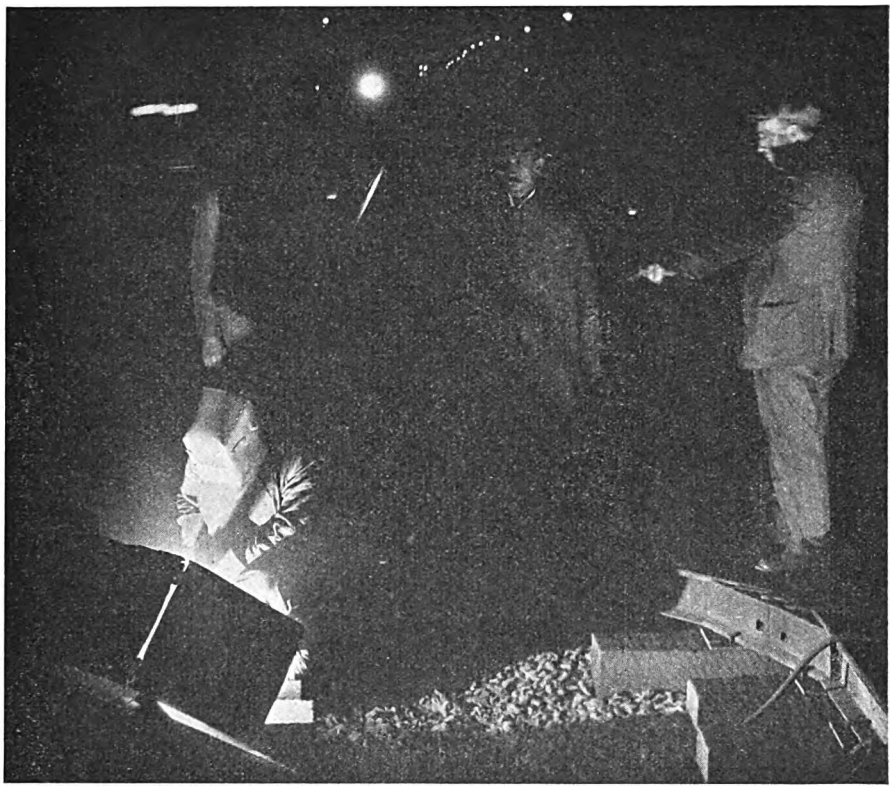
HALE & KILBURN CO.

General Offices and Works: 1800 Lehigh Ave., Philadelphia

SALES OFFICES

Hale & Kilburn Co., Graybar Bldg., New York.
Hale & Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg, Dallas, Texas
H. M. Euler, 53 First St., Portland, Oregon

Digitized by Google



STOODY MANGANESE WELDING ROD

Deposits 12 to 14% manganese steel which is clean, close grained, sufficiently hard and surprisingly tough.

Furthermore, the deposit is made with the least possible heat (from 100 to 125 amperes and 20 to 25 volts when the application is made electrically). Consequently the parent metal on which the deposit is made remains uninjured.

You Should Standardize on Stoody Manganese Welding Rod and Lengthen the Life of Your Special Track Work

STOODY COMPANY

Manufacturers of

Welding Rod ◆ Alloy Steels ◆ Equipment

WHITTIER, CALIFORNIA

Digitized by Google

IN 1914

the joints were "shot" but they had the courage to try to save this rail . . .

Actual photo of rail welded in 1914 and recently taken out on Third Avenue Railway System, New York City.

METAL & THERMIT

Pittsburgh **Chicago** **Albany** 120 BROADWAY

Digitized by Google

IN 1930

the rail was worn out after sixteen more years under heavy city service . . .

IT TOOK courage, back in 1914, to spend good money for Thermit-welding track in which the joints were already badly worn. Thermit had not then won the recognition it now possesses. It was still generally considered an experiment in America. It is to the credit of the officials of Third Avenue Railway System of those days, that they recognized an opportunity. The rail itself was still good, but the joints were "shot." And so they decided to Thermit-weld. They took a courageous step to save money by spending money.

And what a return this investment paid! Think of street car track, in front of the General Post Office in the heart of New York City, rejuvenated by Thermit-welding in 1914 and then lasting until 1930. Many a road has laid new track since 1914 and has had to replace it already, even under lighter traffic conditions. Why? Because the joints which are the weak spots in every piece of track are often neglected.

Thermit-welding is really most economical. It eliminates the weak spots by eliminating the joints.

New track—laid with Thermit joints will last longer and cost less to maintain. Joint repairs will be practically nil.

Old track—can be saved for years of further useful life by Thermit-welding every joint. It will ride more smoothly and wear more evenly.

Now is the time to save by spending money—carefully! Let us make a survey of the rail joint situation on your property and offer a Thermit-welding maintenance plan. No obligation involved.

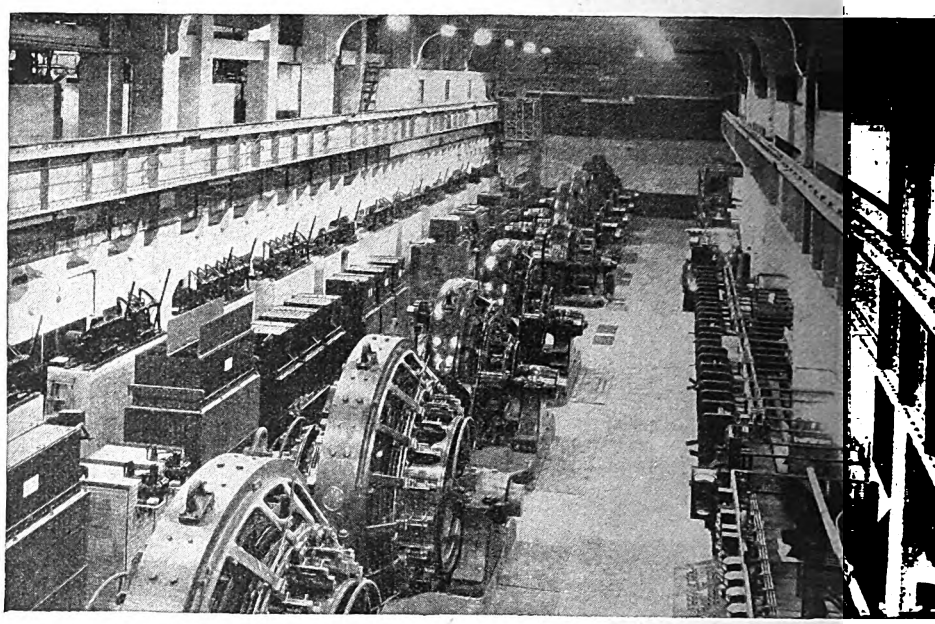
CORPORATION

NEW YORK, N.Y. South San Francisco Toronto

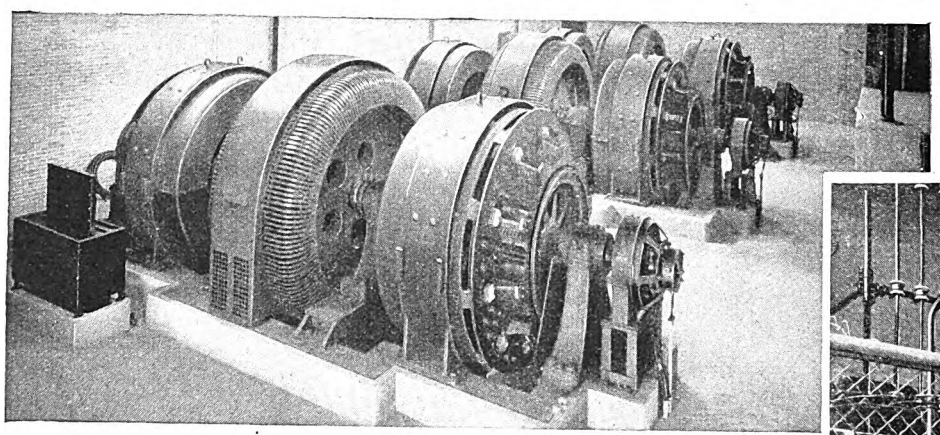
Digitized by Google

Reliable Power—

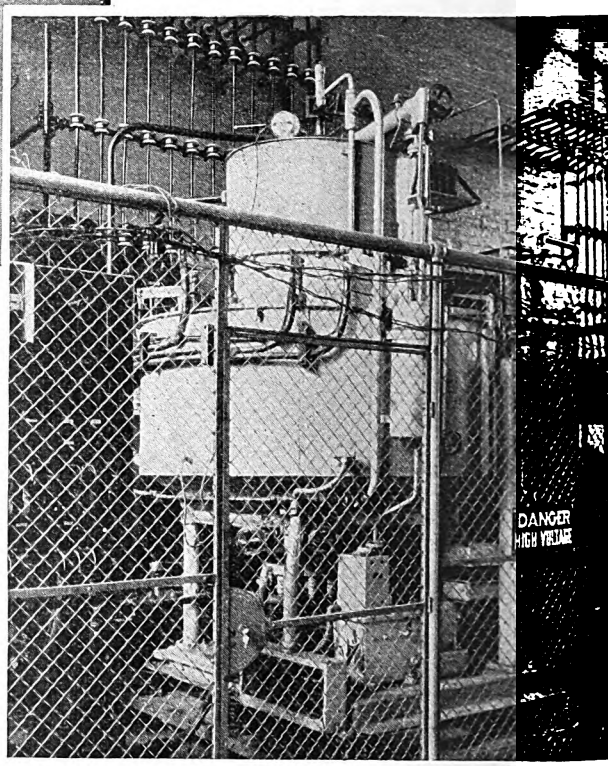
GRAND CENTRAL SUBSTATION of the New York Central Railroad is located 100 feet below the street level at Forty-third Street and Lexington Avenue. The equipment includes ten G-E synchronous converters, several being of 4,000-kw. capacity, and G-E manual switchgear



The CLEVELAND UNION TERMINAL electrification is supplied with power through two G-E equipped automatic substations. Substation No. 1 includes three 3-unit, 3,000-kw., 3,000-volt, direct-current synchronous motor-generator sets complete with automatic and supervisory switchgear



The DELAWARE, LACKAWANNA AND WESTERN railroad electrification is supplied with 3,000-volt direct current through 13 G-E mercury-arc rectifier units ranging in capacity from 1,500-kw. to 3,000-kw. The transformers and switchgear are also of General Electric manufacture.



JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N. B. C. NETWORK

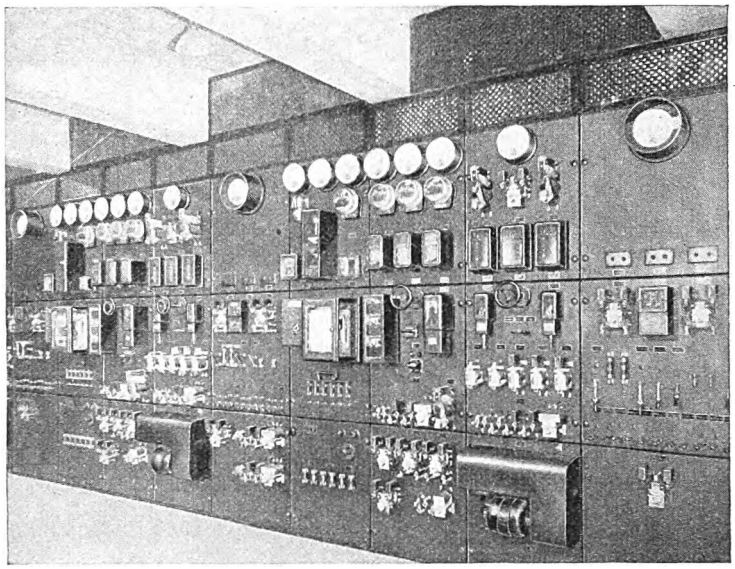
GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

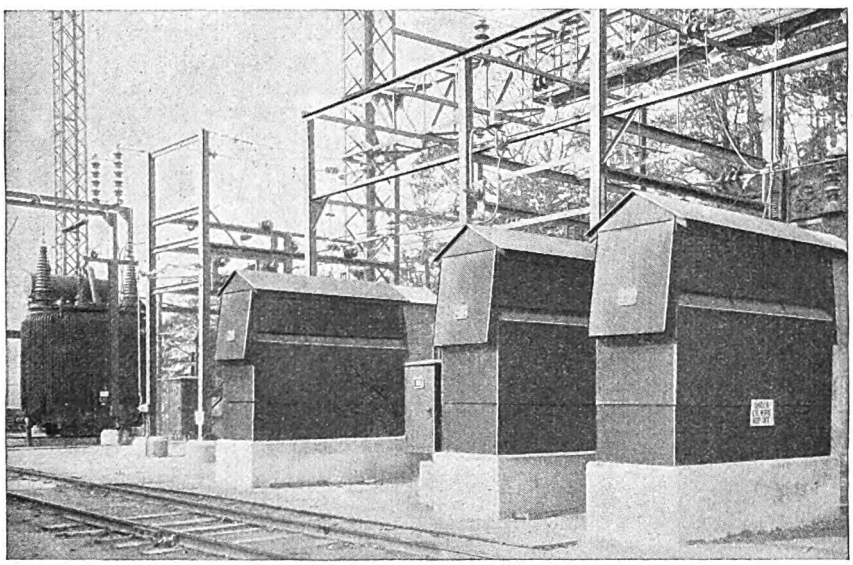
Digitized by Google

Reliable Control

CINCINNATI, OHIO, 19 G-E equipped automatic substations th G-E supervisory control form the largest completely tomatic trolley power system in the world. The illustration shows the interior of one of the single-unit stations



The CLEVELAND UNION TERMINAL electrification includes a large amount of G-E automatic switchgear. The panels illustrated control the three 3,000-kw., 3,000-volt synchronous motor-generator sets in substation No. 1



The PENNSYLVANIA railroad electrification is equipped with sixty G-E 11,000-volt, high-speed, circuit breakers, and twenty-five more units have been ordered. The READING COMPANY also plans the installation of forty similar equipments

TO meet every electrical requirement of railroad operation, General Electric manufactures motor-generator sets, synchronous converters, and mercury-arc rectifiers complete with control equipment for manual, semiautomatic, or full-automatic operation.

The long, comprehensive experience of G-E engineers qualifies them to analyze your power problems and to recommend equipment that is certain to result in improved operation and greater economy. You can obtain complete information from the nearest G-E office.

130-29

ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

Digitized by Google

Compare Your Operating Costs with These—

SOME ESTIMATED OPERATING COSTS OF THE 40-PASSENGER TROLLEY BUS

	Cents per bus mile
Maintenance of electric equipment	0.5 to 0.7
Maintenance of overhead lines	0.6 to 0.9
Electric power	2.3 to 2.6
Car house	1.0 to 1.4
TOTAL	4.4 to 5.6

THE unusually low maintenance and operating costs of the 40-passenger trolley bus are an advantage of the very first importance to every operator. Add to this, automatically smooth, fast acceleration, maneuverability in traffic, electric heating, and quietness, and you have the reason why so many operators are considering this modern vehicle. General Electric is prepared to furnish complete electric equipment for trolley-bus operation, including air brakes and line material. Ask your nearest G-E office to give you further information.

Join us in the General Electric program, broadcast every Saturday evening on a nation-wide N. B. C. network

G-E equipped trolley bus in Knoxville, Tenn.

330-154

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

Digitized by Google

Emergency Brakes that Brake—every time!

Peacock Staffless Brakes are dependable . . . when the emergency occurs they are there with lots of power . . . fast on the take up . . . and they never clog with chain *no matter how much slack there may be in the rigging.*

Sturdy, rugged brakes. Light in weight. Compact, take up little platform space. And braking force is 3000 pounds. When you buy specify Peacock Staffless Brakes.

NATIONAL BRAKE CO., INC.

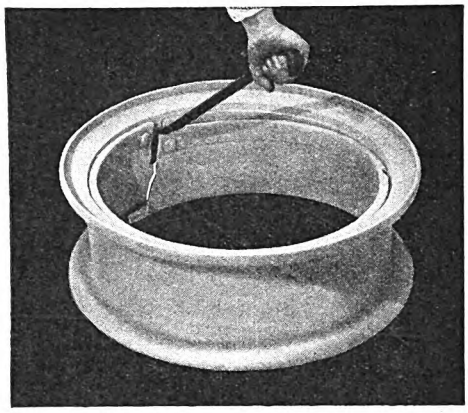
Buffalo, N. Y.

Canadian Representative
Lyman Tube & Supply Co., Ltd., Montreal, Can.
The Ellcon Company—General Sales Representatives, 50 Church St., New York

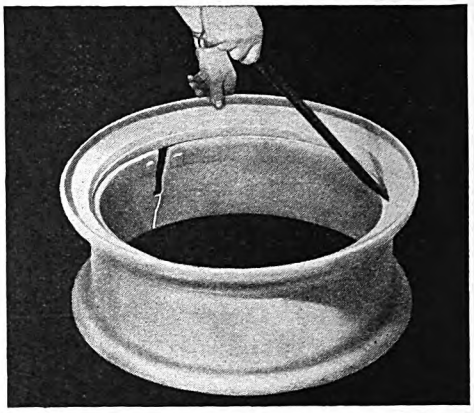
PEACOCK STAFFLESS BRAKES

Digitized by Google

OPERATION OF K RIMS IS SIMPLICITY ITSELF!



Pry No. 1—at the joint



Pry No. 2—at the side. Rim is ready for tire

To save time and cost use K Rims *as standard fleet equipment*

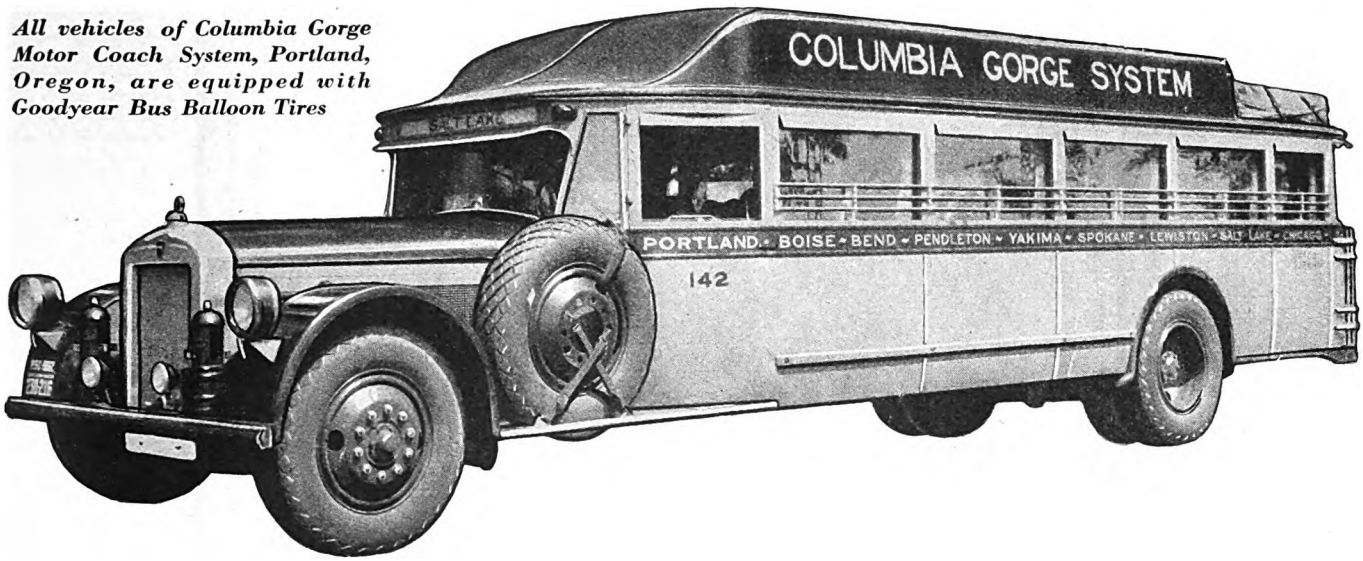
Fastest rim to operate. Two pries with a bar prepare K Rims for mounting tires. When tire is mounted, rim parts are firmly locked together and will not separate — always safe on road. Open valve-stem slot for further ease in handling. K Rims are interchangeable when used for singles or duals. Construction strong and light and permits maximum ventilation for heated brake drums. They guard against premature tire failure; economical always. Standard rims for money-making trucks and buses everywhere. Specify for your fleet now.

THE MAN WHO CHANGES THE TIRES LIKES K RIMS

GOODYEAR

K RIM EQUIPMENT FOR TRUCKS AND BUSES

Digitized by Google



All vehicles of Columbia Gorge Motor Coach System, Portland, Oregon, are equipped with Goodyear Bus Balloon Tires

"Traction so good, chains were rarely used"

—and it was mountain driving in winter!

"Portland—Boise—Bend—Pendleton—Yakima—Spokane—Lewiston—Salt Lake—Chicago"—these are the names on the side of this coach, and if you spot those cities on the map, you will find real mountain driving between them.

"Since this company's equipment has all been changed over to balloon tires," says a letter from Columbia Gorge Motor Coach System, "it has been noted that the mileage per tire has increased greatly with practically no delay of schedules on account of tire trouble... also, as we have gone through the worst of the winter months, we can say that these tires have very good traction on wet and slippery pavements, considering the fact that chains have only been used on our buses when road conditions were unusually bad and for only a very short time."

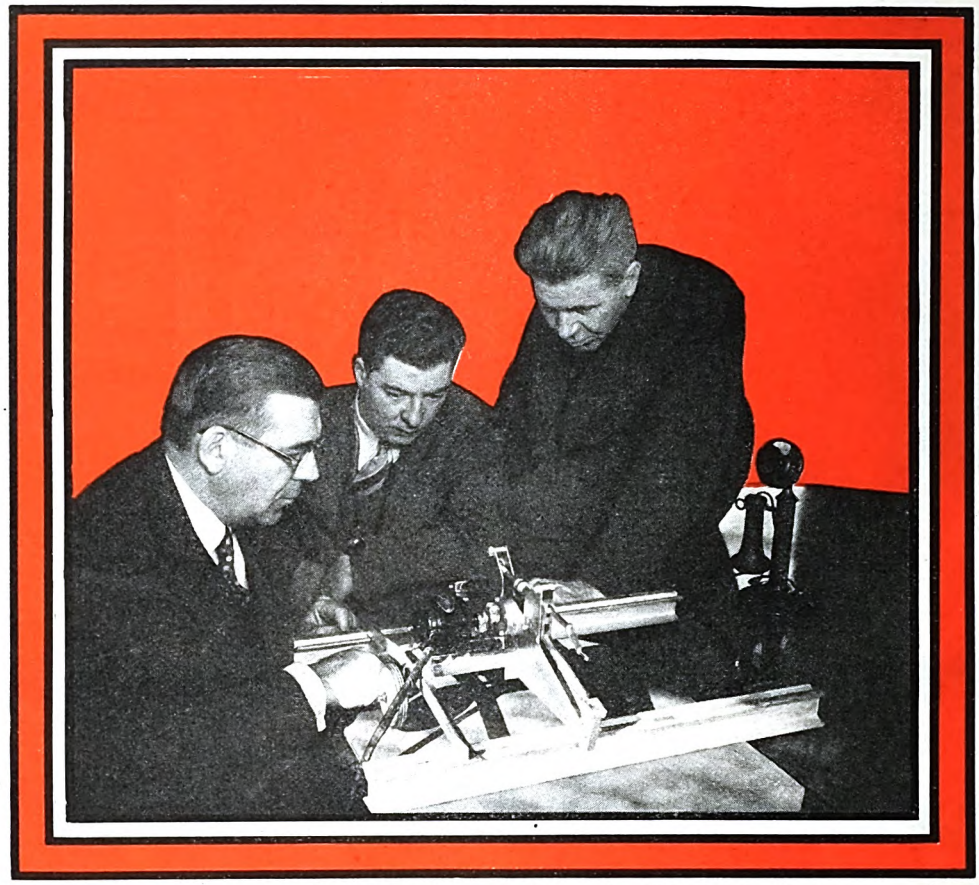
The tires, of course, are Goodyear Bus Balloons—the traction being provided by the famous Goodyear All-Weather Tread.

GOODYEAR

The Greatest Name in Rubber

ON YOUR NEW COACHES SPECIFY GOODYEARS

Digitized by Google



Group observing operation of electrically operated model of "Mortar-Flow" Pulsator.

Make Your Own Demonstration Of The "Mortar-Flow"* Principle On Your Own Desk!

SEVERAL operating, quarter size models of the "Mortar-Flow" Pulsator (Derail Type) are now available for a demonstration which you can make yourself in your own office to a group of your track men. On request the model, with complete instructions for its operation, will be expressed direct to your office.

Only by actually seeing the "mortar-flow" method (vibration during placement) in operation can you see the reason why it makes *all* the concrete in any type of construction effective; how, by causing the concrete to flow and bond with the steel, it fills all voids and seals the track structure against surface water—see how the labor of spreading and leveling is reduced; how hand tamping is eliminated and why a denser, more waterproof concrete is produced because excess water is brought to the top of the slab.

See why maximum results with the "mortar-flow" method (vibration during placement) are obtained with Steel Twin Ties.

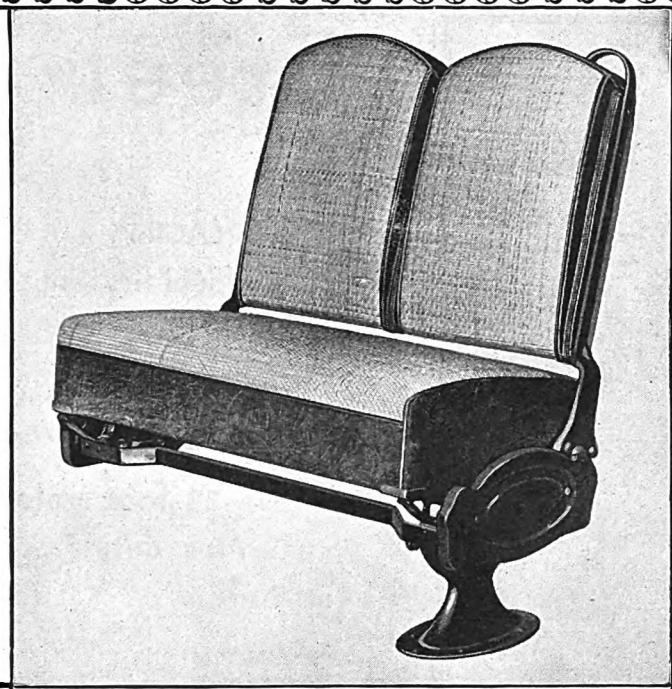
You've heard about it; how widely it is approved by users—now see it operating on your own desk. There is no obligation of any kind except to return the model when you have finished with it, express collect.

IN using the "Mortar-Flow" Principle, for vibration of any type of track structure during placement of concrete to cause it to settle, flow, fill voids and bond with the structure, you are protected by U. S. Patent Nos. 1,745,744 and 1,770,154.

*The "Mortar-Flow" Principle is the vibration of the structure during concreting.

THE INTERNATIONAL STEEL TIE CO., Cleveland, Ohio

Digitized by Google



A Comfortable, Sanitary and Modern Seat!

HERE is a seat which maintenance engineers will appreciate. Its close-woven cane webbing back and cushion are easy to keep clean. The genuine leather facing on the cushion reinforces the seat at the greatest point of wear. In addition, the individual backs and deep, spring cushions are shaped to allow proper posture and leg freedom. Mechanism rails are set in and the frame of the chair is made of selected Northern hard-grained ash, further strengthened by malleable iron braces. Write to the nearest Heywood-Wakefield sales office for complete details of the 327-M Special and other popular bus and electric railway seats in our line.

If you have not received a copy of our new Bus Seat Catalogue, write for it.

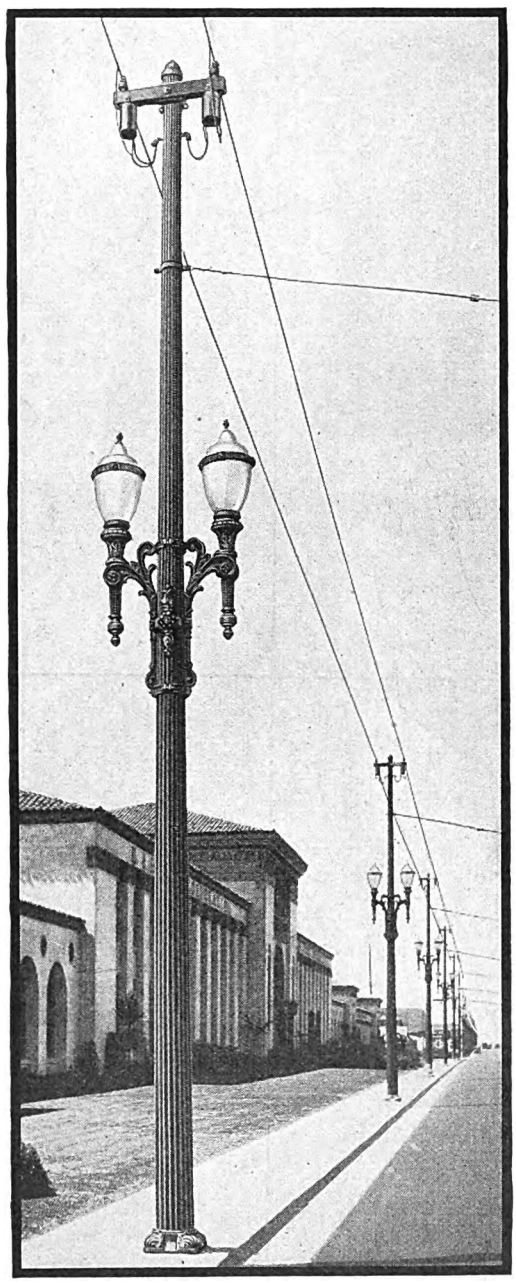
HEYWOOD - WAKEFIELD COMPANY

BOSTON, MASSACHUSETTS

516 West 34th St., New York City
J. R. Hayward, Liberty Trust Bldg., Roanoke, Va.
H. G. Cook, Hobart Bldg., San Francisco, Calif.
439 Railway Exchange Bldg., Chicago, Ill.
A. W. Arlin, Delta Bldg., Los Angeles, Calif.
The G. F. Cotter Supply Co., Houston, Texas
The Railway and Power Engineering Corporation
133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada

Digitized by Google

Now Berkeley Chooses Fluted Steel POLES



Berkeley, California, is noted for its beautiful thoroughfares

REPLACING other poles and individual lighting standards, Union Metal Heavy Duty Poles have transformed the appearance of San Pablo Avenue in Berkeley, California.

These 32-foot poles perform their numerous duties safely and with a minimum of attention. Slender, straight and uniform, they represent the ideal method of carrying electrical services through city streets.

In Berkeley the Union Metal Poles are equipped with twin street lighting units, cross arms, trolley span-wire supports and concealed cable-risers. In numerous other cities they are also used for a multitude of duties — often at a great saving in cost and always to the betterment of street appearance.

If you are not familiar with this advanced type of pole write for complete information.

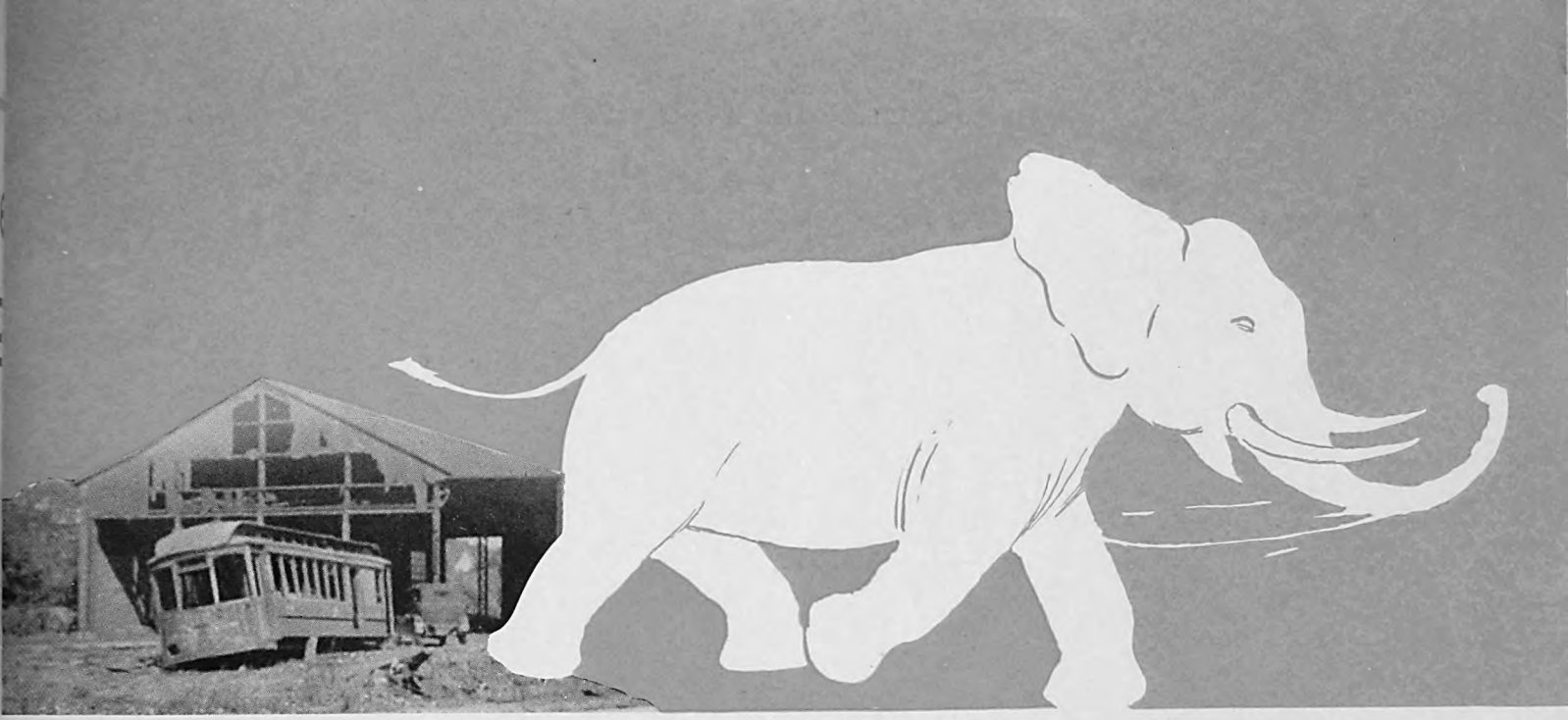
THE UNION METAL MANUFACTURING COMPANY
GENERAL OFFICES AND FACTORY • CANTON, OHIO
SALES OFFICES: New York, Chicago, Cleveland, Boston, Los Angeles, San Francisco, Seattle, Dallas, Atlanta

DISTRIBUTORS
General Electric Merchandise Distributors Graybar Electric Company, Inc.
Offices in all principal cities

Distributed by Graybar

UNION METAL DISTRIBUTION POLES

Digitized by Google



Changing the complexion of a white elephant in Olean, N. Y.

The economical conditions affecting many of the hundreds of small inter-urban properties in America are, in many respects, identical.

Transportation men, individually and collectively, have studied and analyzed this problem repeatedly, yet it still remains one of the most discussed problems of transportation.

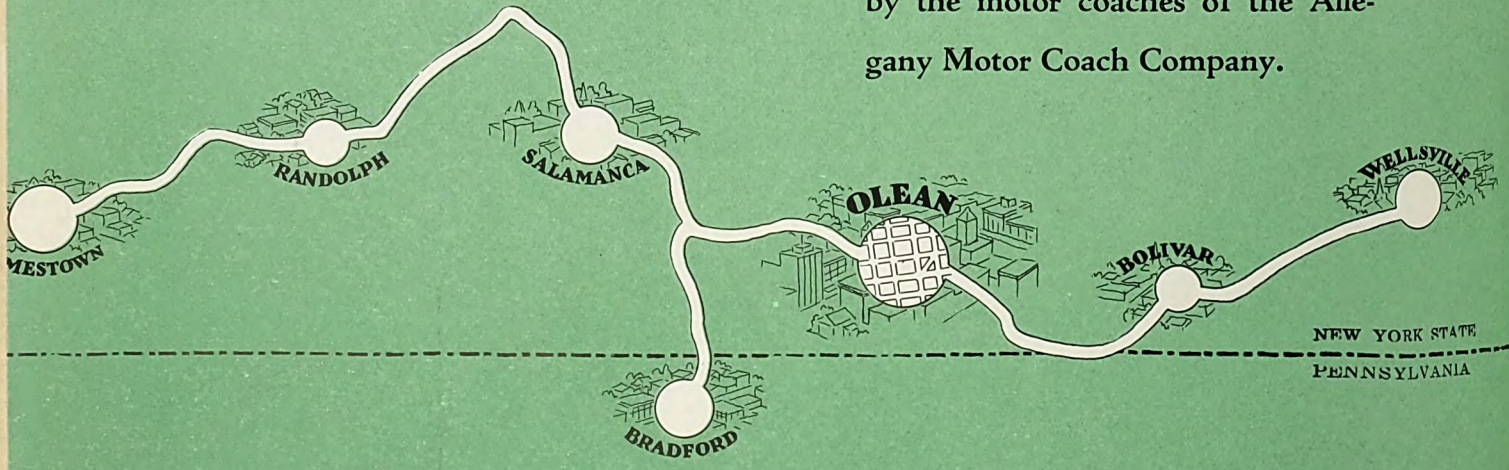
Here is another splendid example of how a small city and inter-urban operation, that had become hopelessly involved financially, went all bus — *with gratifying results.*

It can be done with

Yellow Coaches

Digitized by Google

Much the same territory previously served by the abandoned urban and interurban rail lines is now served by the motor coaches of the Allegany Motor Coach Company.



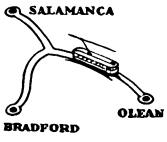
Digitized by Google

he oil boom in the Pennsylnia fields made Olean a prosperous community.

50 years ago, oil was discovered near Olean, N. Y. and the population of that busy little community had suddenly doubled — trebled. It had become a city of 10,000 people. So, its progressive citizens organized and financed a needed street railway — 1.1 miles of single track running from the railway station to the center of town! Three horse cars operating on 3 foot 6 inch track of 25 pound rail. The schedule was every 30 minutes and it took 20 minutes to cover the route.

: took twenty minutes to cover one mile of route.

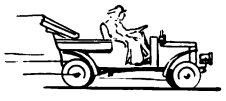
37 years ago, they were talking modernization in Olean. The transportation system had prospered. During the previous year 140,774 passengers had been carried at a 5 cent rate of fare, track mileage had been increased to 2.5 and a fourth car had been added at a cost of $314. John Forbes, President and General Manager, was receiving a salary of $1,020 a year. Drivers were paid $1.33 for a nine-hour day. Times had been good. The net annual earnings amounted to $2,661. It was an opportune time to modernize. The age of electricity had arrived. So, in 1893, electric cars were substituted for horse cars. Refinancing was easy.



Temporary conditions favored expansion and consolidation.

27 years ago they were talking consolidation in Olean. Bradford, a neighboring city just over the Pennsylvania line, also had a railway company. Interurban service between the two prosperous cities had been established as a joint operation. Then everything was consolidated. In 1906 the new company was operating 59.9 miles of single track and 27 cars, but the investment now amounted to $2,061,000. Net profits amounted to $51,000 — a 2½ per cent return.

Further expansion followed. Just 20 years ago the company had cumulated investments of $5,000,000, half of it a bonded indebtedness. Income, however, had grown to $377,802, net to $193,360 — still a 2½ per cent return.



The peak of passenger revenue was reached when the automobile arrived.

But the peak of passenger revenue and income had been reached. Automobile competition had arrived. The oil boom in Pennsylvania was over. Transportation revenues began dropping steadily year after year and despite fare increases the net finally dipped far under the amount needed to pay interest on the bonded debt, to say nothing of paying a return on the stock issued.

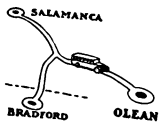
It can be done - with

Yellow

Coaches

Digitized by Google

Disgruntled stockholders became bitter in their denunciations.



The coach operation replaced the 90 mile interurban with its $5,000,000 capitalization.

The new transportation system is making a good return on its investment.

Every month in 1930 but one has been ahead of 1929 in revenue.

Service became a travesty. Slow and infrequent schedules, breakdowns and accidents became the order of the day. Wages finally represented 53 per cent of all expenses, costs per car mile amounted to 48 cents. Disgruntled stockholders became bitter in their denunciations.

Three years ago, the court ordered the property abandoned.

A more far-sighted management might have met this problem more successfully. Bond holders and stock holders might have suffered less if everyone concerned had faced the situation squarely and planned for a sound capital reorganization and revamping of the property —

For here is what actually happened.
An outsider stepped in where local talent feared to tread. Local investors and local management had fought shy of re-organization along any lines. Local transportation was in bad repute. Local capital was uninterested and afraid.

But an experienced outsider, who knew what could be accomplished with a well managed bus operation, reviewed the situation and with his own limited capital, but ample vision, started—The Allegany Motor Coach Company. And the result —

In 1928 — serving the same territory — 560,000 passengers were carried at a net earning of $11,703, or about 7.5 per cent on investment. This with only 10 coaches.

In 1929 — 600,000 passengers were carried earning $125,296 gross and a net of $12,892, or 8.2 per cent return. With the purchase of additional Yellow Coach equipment, plus operation and careful supervision, operating costs dropped from 24.2 cents per mile to 20 cents per mile.

Every month in 1930 but one has been ahead of 1929 in revenues.

Now 20 employees give adequate service to the community as against 225 at the peak of traction service. There are fewer miles operated and the service may be less frequent, but it is entirely adequate and satisfactory to the public. What is most important, the transportation service is again on a sound and profitable basis.

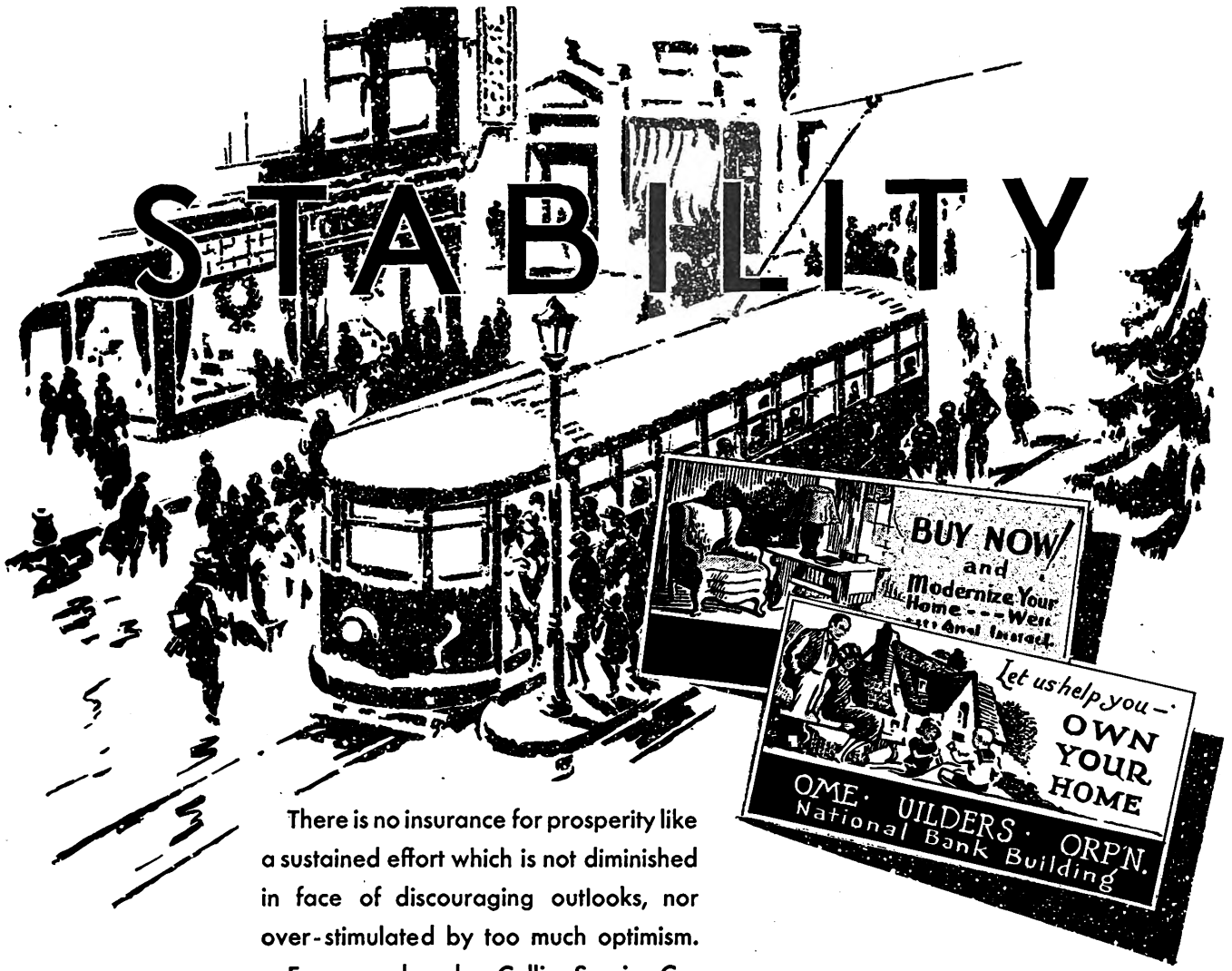
Faith in motor coach transportation and in Yellow Coach equipment enabled The Allegany Motor Coach Company to carry on from where the trolley had left off and converted a white elephant into a profitable business.

It can be done—with

Yellow Coaches

GENERAL MOTORS TRUCK CO. - PONTIAC, MICH.
Subsidiary of Yellow Truck & Coach Mfg. Co.

Digitized by Google



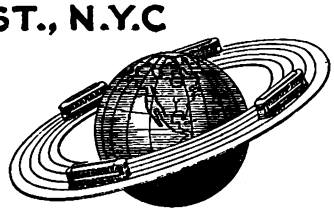
There is no insurance for prosperity like a sustained effort which is not diminished in face of discouraging outlooks, nor over-stimulated by too much optimism.

For many decades, Collier Service Car Cards have kept steadily at it, urging riders to buy. Rain or shine they have been promoting business and so helping to maintain traffic. Better still, they have been a source of income on which the Electric Railway Operating Companies have been able to rely, regardless of the condition of business generally.

CAR CARD ADVERTISING ALMOST EVERYWHERE

BARRON G. COLLIER

INCORPORATED
220 W. 42nd ST., N.Y.C



Digitized by Google

New Sales and Service Facilities for GREDAG
REG U. S. PAT OFF

• LUBRICANTS

ON November 1, 1930, the sales and service facilities for Gredag Lubricants, well known and long established products of the Acheson Graphite Corporation—a Unit of Union Carbide and Carbon Corporation—were greatly extended.

Gredag Lubricants are now being sold and distributed by the Carbon Sales Division of National Carbon Company, Inc.,—a technical organization which for many years has been in constant contact with industrial plants and distributors of industrial products.

The addition of Gredag Lubricants to the products of the Carbon Sales Division will bring into the lubrication field a force of competent sales engineers familiar with industrial problems. It will also add to the previous facilities five conveniently located Branch Sales Offices and Service Plants.

Please address your inquiries and orders for Gredag Lubricants to the nearest Branch Office of the Carbon Sales Division.

NATIONAL CARBON COMPANY, INC.

Carbon Sales Division

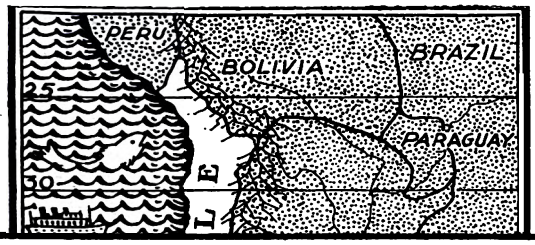
CLEVELAND, OHIO

Unit of Union Carbide and Carbon Corporation

Branch Offices and Factories

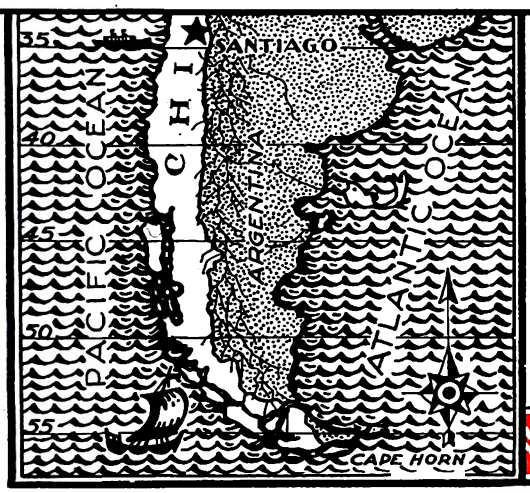
NEW YORK · PITTSBURGH · CHICAGO · BIRMINGHAM · SAN FRANCISCO

Digitized by Google



IN CHILE

Consolidated Equipment



Also Renders . . .
MODERN TRANSPORTATION SERVICE

Interior of Modern Surface Car

Built by

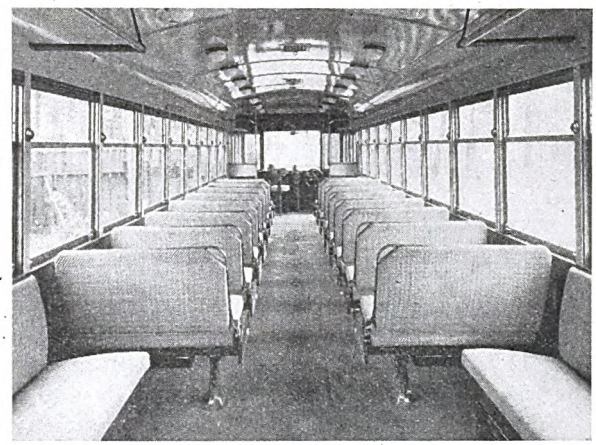
The Kuhlman Plant of the J. G. Brill Co.

Cars Purchased by

Cia. Chilena de Electricidad, Ltda.

for

Cia. de Traccion y Alumbrado de Santiago



Equipped with . . . .

The United States Embassy in Santiago

CONSOLIDATED

Pneumatic Door Operators

Electric Heaters

Buzzer System

CONSOLIDATED CAR-HEATING CO., INC.

NEW YORK ALBANY CHICAGO

Digitized by Google

Digitized by Google

Is this Coincidence?

All three winners in a national speed contest for rapid transit lines use car oils made by Standard Oil Company (Indiana)

We are not trying to convince you that Standard Oil Company (Indiana) car oils were the chief factors in winning this contest. But we do want to register strongly the fact that all three winners, noted for the high speed maintained on scheduled runs day after day, are constant users of Standard Oil Company (Indiana) car oils.

Only with correct lubrication could these rapid transit lines maintain continuous high speed service. It is not only the ability of Standard Oil Company (Indiana) car journal oils to lubricate effectively at all speeds but likewise the savings they make possible by reducing bearing troubles, power costs, waste and babbitt metal that make them popular with electric railway officials . . . and worthy of your consideration.

These journal oils are made of especially selected lubricating stocks and are refined for this one purpose. They do not glaze or harden on the waste. This reduces oiling periods, saving labor and waste costs. They have proven to be very successful in both high speed interurban and ordinary street car service.

One of our men will be glad to discuss these oils with you . . . at your convenience.

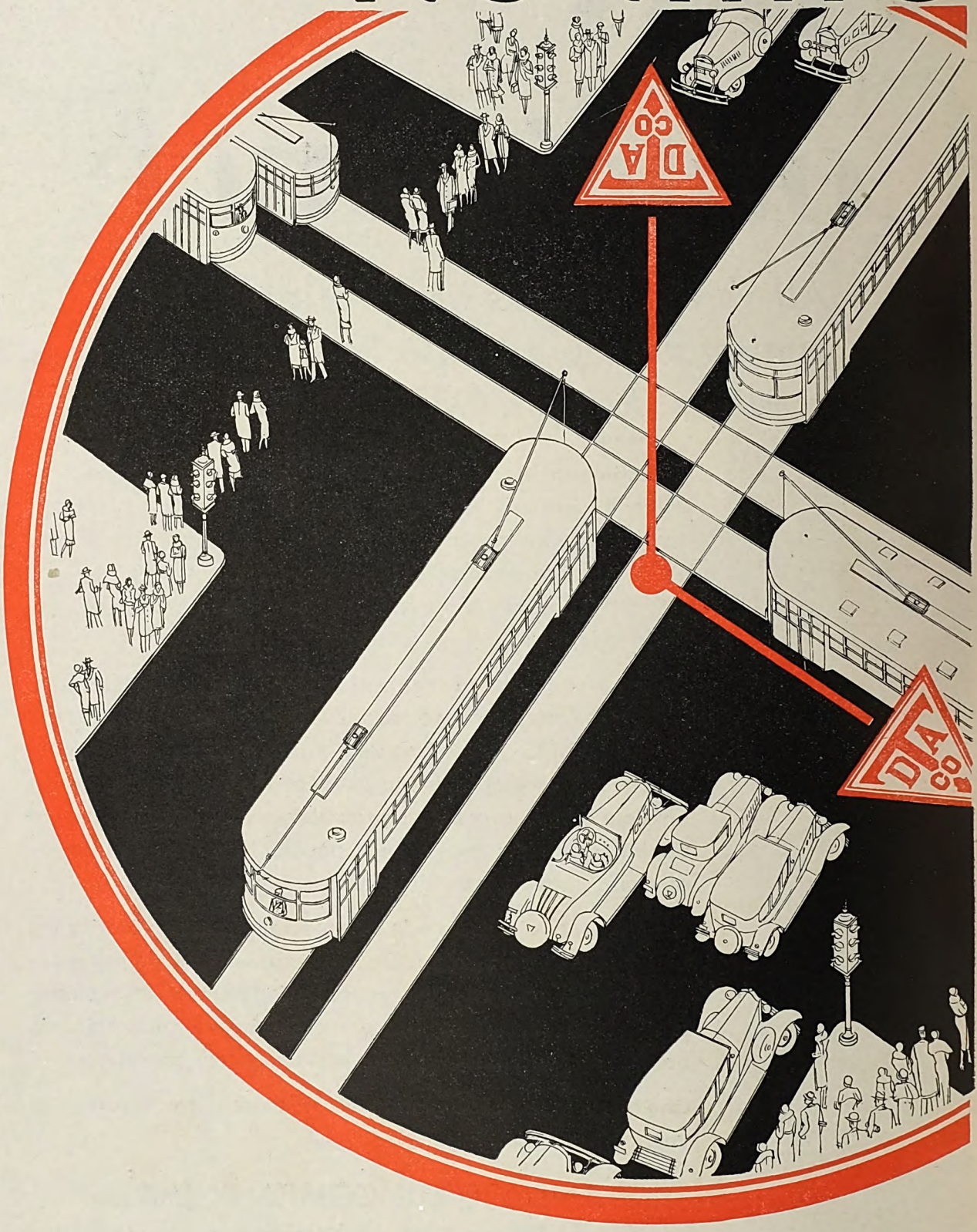
STANDARD OIL COMPANY *(Indiana)*
General Offices: 910 S. Michigan Avenue, Chicago, Ill.

LUBRICANTS *for* ELECTRIC RAILWAYS

210

Digitized by Google

It's time



THE TIMKEN-DETROIT AXLE

Digitized by Google

to act

THERE seems to be a fundamental difference in the thinking habits which characterize the automotive and electric railway industries.

The automotive industry searches for new and better methods and equipment—one explanation for its astounding growth. It eagerly reaches out for improvements; tests them; adopts them.

The electric railway industry seems to pursue a more cautious policy. Certain men, to be sure, have shown a fine contempt for hampering tradition; but for the most part, new equipment continues to be "obsolete the day it is bought."

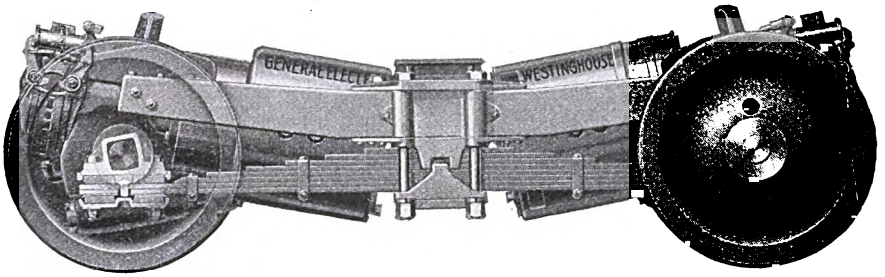
Timken has brought forward "something better"—the Timken Worm Drive Truck for electric railway cars.

It saves weight and power; lowers operating and maintenance costs, for track and equipment; eliminates most of the noise; and conserves man efficiency—the crews like Timken-equipped cars.

These cars appeal to car riders; once they ride in Timken worm-driven cars, their opinion of street car transportation takes a tremendous jump.

The electric railway industry needs constructive suggestions. We've made one. We've told the facts about it—been telling them for two years.

It's time for you to act.



TIMKEN
worm drive
TRUCKS
for electric railway cars

CO., DETROIT, MICHIGAN

Digitized by Google

KOOLMOTOR *perfect winter*

to Reading Transit Bus Company's large fleet . . . .

CITIES SERVICE OILS

ONCE - ALWAYS

COLD, bitter winter days cause no worry for the Reading Transit Bus Company — their buses are lubricated with KOOLMOTOR Motor Oil and KOOLMOTOR Transmission Oil— perfect cold weather lubricants. These companion products assure easy starting and easy shifting when engines are cold and — complete protection to friction surfaces and gears on the long, hard pulls that follow.

It is a tribute to the high and uniform quality of KOOLMOTOR products that they were chosen by the largest bus operator in Reading, Pa. The Reading Transit Bus Company's fleet of 18 buses travels approximately 1,000,000 miles a year, carrying about 1,500,000 passengers.

It will pay you to have a Cities Service engineer call, study your lubrication problem, and suggest ways and means of lowering your operating costs.

CITIES SERVICE COMPANY

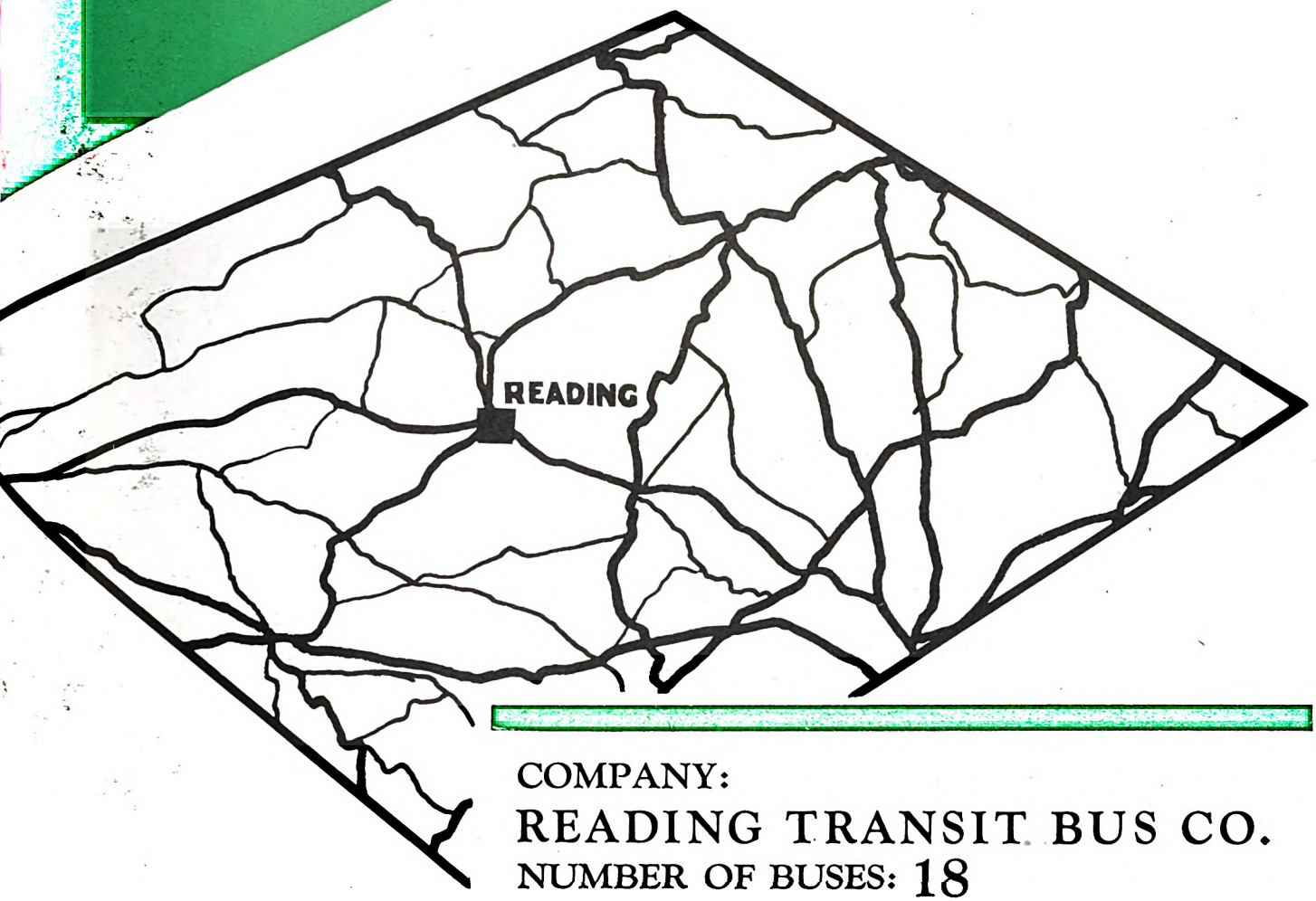
60 WALL STREET, NEW YORK

CITIES SERVICE OILS ONCE - ALWAYS

KOOLMOTOR PRODUCTS

Digitized by Google

OILS give protection



COMPANY:

READING TRANSIT BUS CO.

NUMBER OF BUSES: 18

BUS MILES: 75,000 Per Month

PASSENGERS CARRIED: 125,000 Per Month

CITIES SERVICE PRODUCTS USED:

- KOOLMOTOR MOTOR OIL
- KOOLMOTOR TRANSMISSION OIL

Digitized by Google

A new low mark in wheel costs with

DAVIS "One-Wear" STEEL WHEELS

The high maintenance costs of removing, re-turning, and replacing car wheels can be permanently and materially reduced to a minor item in car operation.

Davis «One-Wear» Steel Wheels will do it.

The reason is in their manufacture and the alloy steel used.

They are produced by triple-heat treatment, part of a carefully developed manufacturing process.

The results are great wear resistance, strength, and lightness, and

reduced operating costs per wheel mile, and

cars in service, earning revenue, not in the shop with flats and shellouts.

It is the answer to your car wheel upkeep problem.

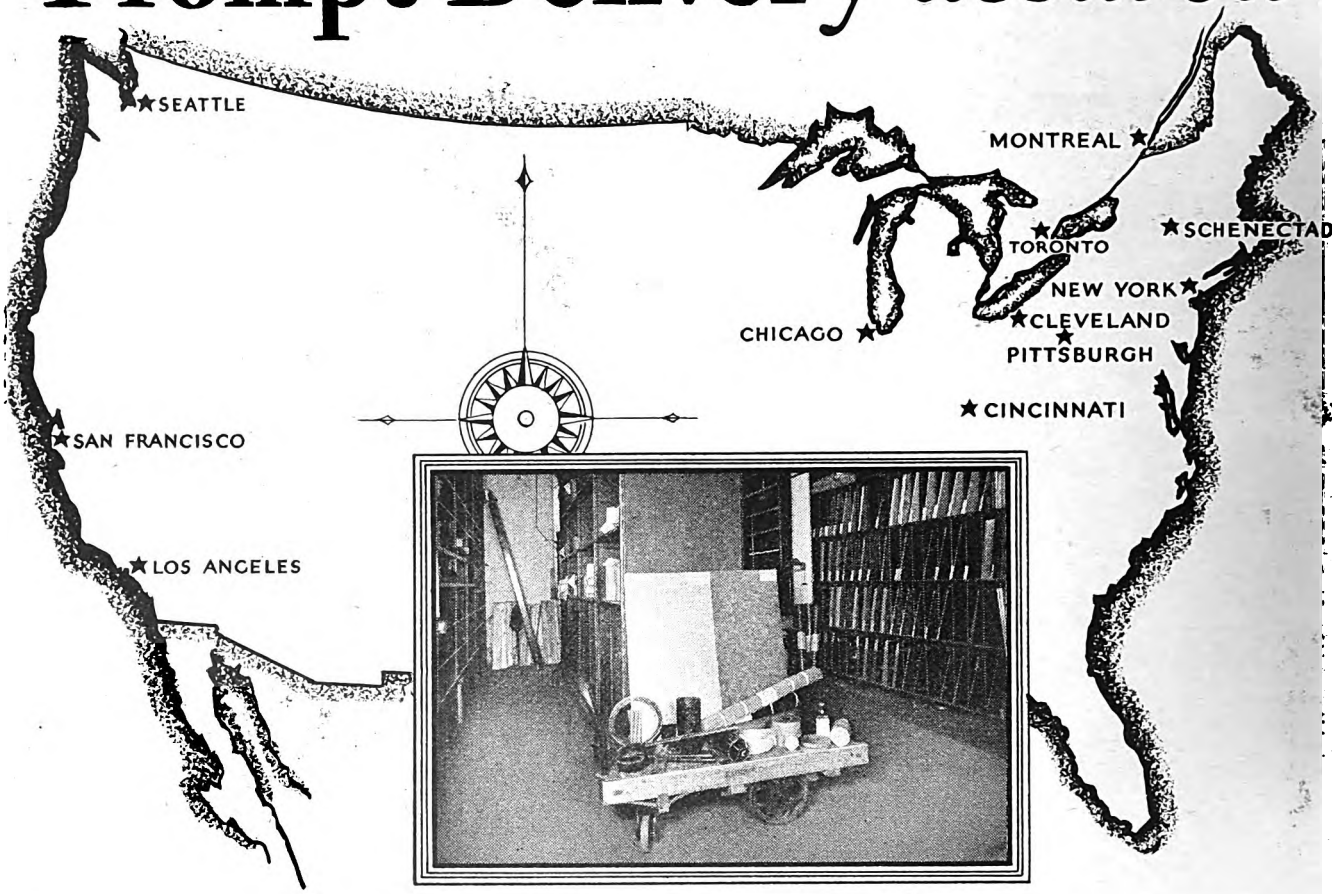
We suggest you investigate as a matter of economy.

AMERICAN STEEL

Digitized by Google

Digitized by Google

Prompt Delivery *assured*



from these stocks of electrical insulation

Super-Micanite and Micanite for commutators, slots, rheostats and similar insulating needs! Empire Varnished Insulating Materials for motors, coils, cable joints, etc.! They are carried in stock in the cities starred on the above map.

Our representatives in these cities are at your service to help assure the prompt delivery for which the Mica Insulator Company is noted. Their knowledge of the characteristics and successful application of these insulations is yours to use at any time.

MICA INSULATOR COMPANY

New York: 200 Varick St. Chicago: 542 So. Dearborn St.

Cleveland Pittsburgh Cincinnati Birmingham Seattle San Francisco
Los Angeles Toronto Montreal *Works:* Schenectady, N. Y. London, Eng.

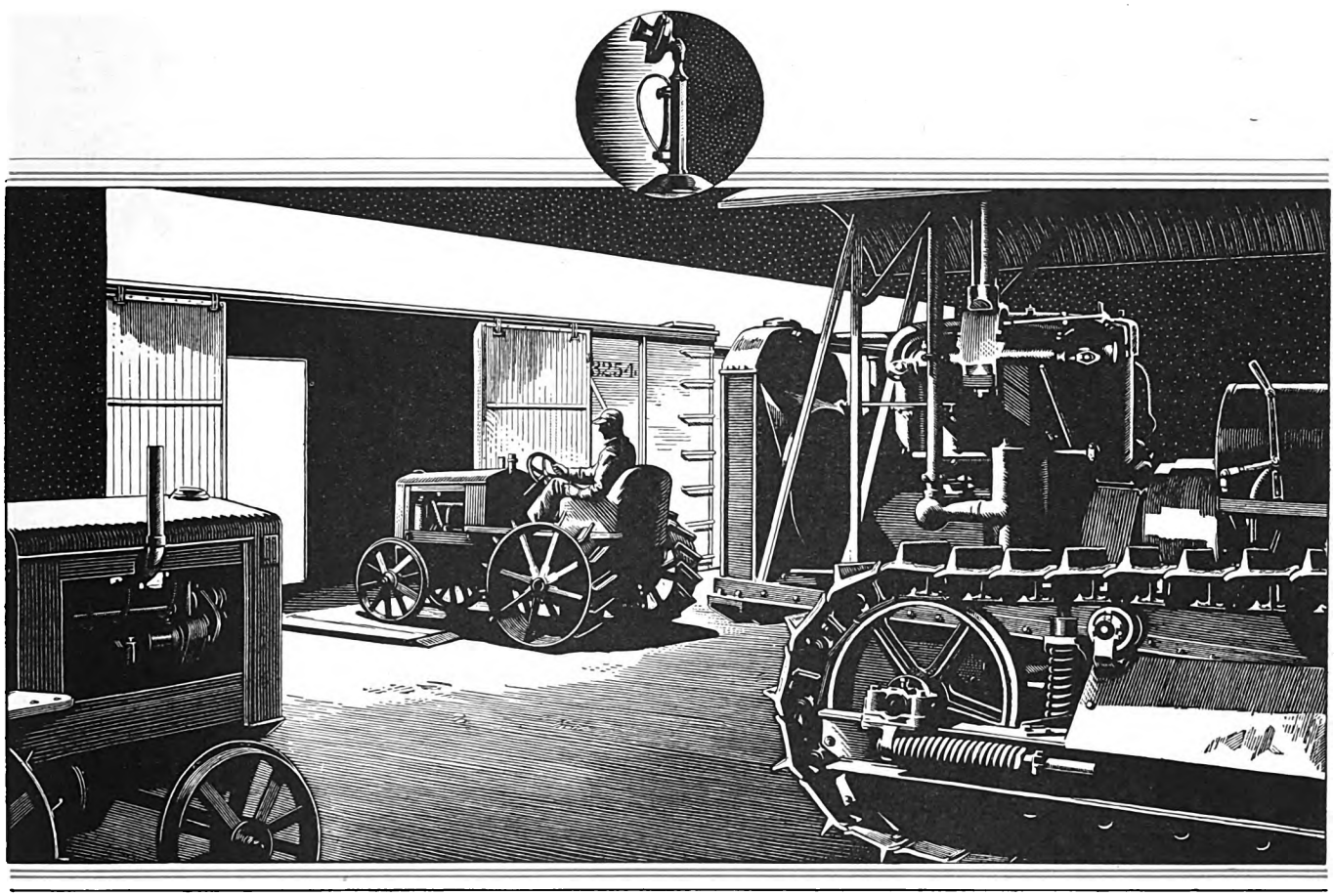
PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF.

Electrical INSULATION

PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF

MICA INSULATION OILED CLOTH INSULATION

Digitized by Google



Business was Quiet...but the Telephone brought $22,200 in New Orders

A TRACTOR company's sales had fallen off to a marked degree. A telephone sales program to distant customers was decided upon. One result was $18,400 worth of business. Another, a $3800 order after the purchaser had refused a personal interview.

An Eastern lumber company regularly "visits" lumber yards in five states by telephone. In one month 550 carloads of lumber totaling nearly $500,000 were sold by this modern method. Toll bills averaged less than one-half of one per cent.

Business firms, large and small, are using out-of-town telephone service more than ever to increase sales . . . reduce distribution costs . . . meet competition. New markets are developed at little expense. Customers and prospects are economically contacted between salesmen's visits.

Develop your business by telephone. Best results are obtained by having a definite plan for executives and salesmen to follow. Your local Bell Telephone Business Office will gladly submit a plan to meet your needs.

Inter-city calls are cheap, definite, resultful. Typical station-to-station day rates: Pittsburgh to Indianapolis, $1.50. Boston to Atlanta, $3.50. New York to Baltimore, 90c. Philadelphia to Seattle, $8.50. Bell Telephone service is *Quick . . . Convenient . . . Universal.*

Digitized by Google

1931— What

WHAT *has happened in the industry in 1930?*

DID WE *gain or lose—and how much?*

WHAT *are our prospects for 1931?*

THESE are the questions that community transportation men are asking themselves as this unusual year nears its close. The Annual Statistical and Progress Number will not only present complete, up-to-date statistics and forecasts regarding every important activity of the field, but it will also contain timely information about such pertinent topics as the trolley bus —rapid transit—trailers—bus operation and other subjects that are claiming the attention of transportation executives.

Look for the answers

Digitized by Google

will it mean to the ELECTRIC RAILWAYS?

NEVER was there a time when executives had greater need for FACTS than in this present period of abnormal business conditions. Figures, statistics, dependable data—this kind of information, interesting always, becomes vitally important at a time like this.

In its January issue, ELECTRIC RAILWAY JOURNAL will present the facts that transportation and manufacturing executives want and need in planning for 1931.

Figures and comparisons on costs and fares—expenditures and improvements—trackage—rolling stock and every other phase of general interest will be given, all brought up to date.

ANNUAL STATISTICAL AND PROGRESS NUMBER

This year's record simply confirms past experience: in periods of dull business, the electric railway industry is among the least adversely affected. In the past half-century, the industry has weathered numerous "depressions" and gone forward again with but few scars. History promises to repeat at present. This year's revenues are off only slightly.

In addition to figures, statistics, trends and forecasts, the 1931 Statistical and Progress Number will contain a new and informative survey of Taxicab Operations by Electric Railways. This and other timely subjects will be discussed in interesting articles.

Here is a number you will want to study and keep close at hand throughout the year. If you want extra copies for others in your organization, order them early.

ADVERTISERS: Forms close December 22. This is a logical issue in which to use extra space and color.

— — *in* ELECTRIC RAILWAY JOURNAL *for January*

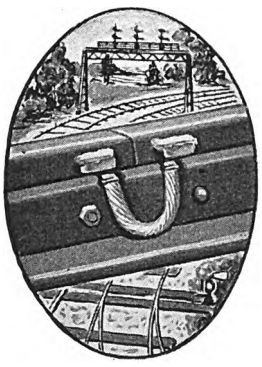
Digitized by Google

Greetings

from

American Steel & Wire Company

Again the Yuletide, with its inspirations of good cheer is with us—the New Year approaches—and we sincerely extend to you our very best wishes for a very MERRY CHRISTMAS and a HAPPY, PROSPEROUS NINETEEN THIRTY-ONE



Rail Bonds

American Steel & Wire Company

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

208 S. La Salle Street, Chicago

30 Church Street, New York

Other Sales Offices: Atlanta Baltimore Birmingham Dallas Denver Detroit Kansas City Oklahoma City Philadelphia Pittsburgh Salt Lake City

Boston Buffalo Cincinnati Cleveland Memphis Milwaukee Minneapolis-St. Paul St. Louis Wilkes-Barre Worcester

Pacific Coast Distributors: Columbia Steel Company, San Francisco, Los Angeles, Portland, Seattle, Honolulu

Export Distributors: United States Steel Products Co., 30 Church St., New York City

Digitized by Google

—and NOW!

the "6" series

of

FARGO
BUILT BY CHRYSLER MOTORS

MOTOR COACHES

supplementing the "8" series recently announced

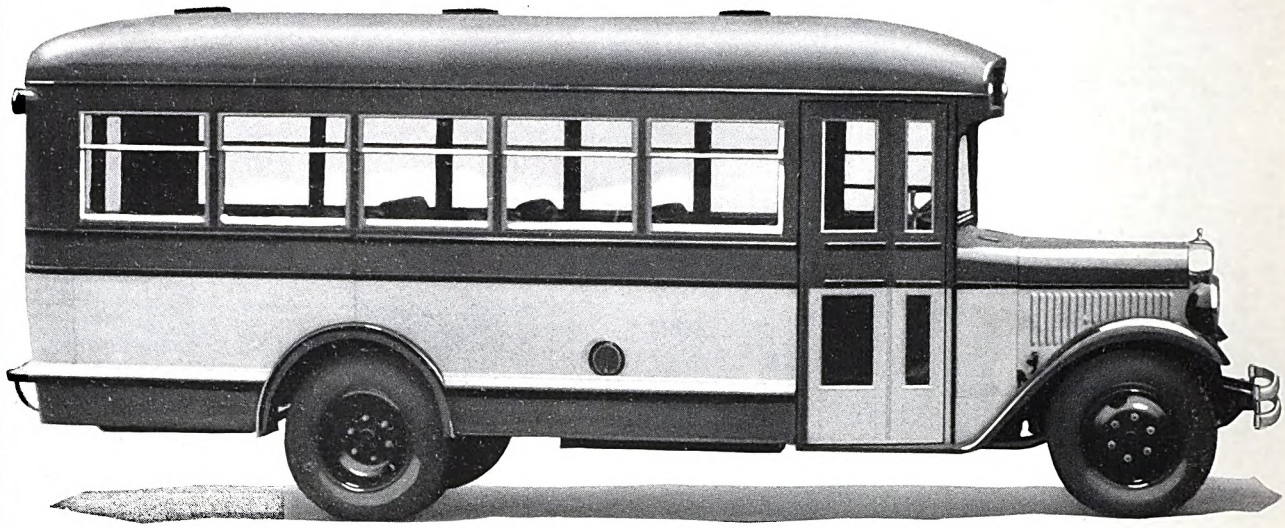
by

FARGO MOTOR CORPORATION

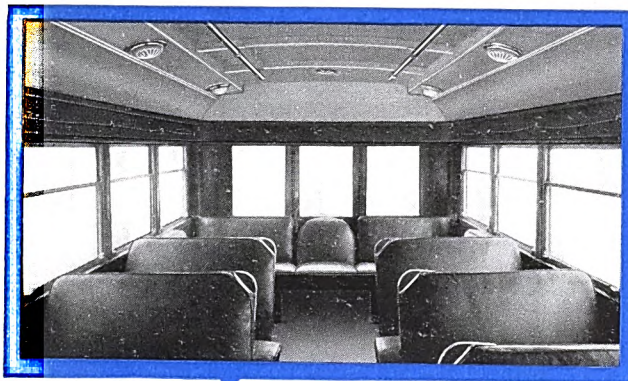
DETROIT, MICHIGAN

A DIVISION OF CHRYSLER CORPORATION

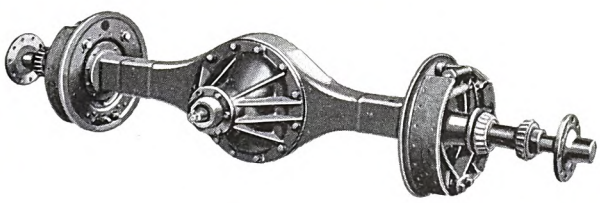
Digitized by Google



In addition to the new and original "8" Series Coaches recently introduced, Fargo Motor Corporation also announces the new "6" Series. It comprises a Street Car with seats for 21 passengers and a Parlor Coach with seats for 16 passengers. » » Of conventional design and lower in price than the "8" Series Models, this supplementary line is the logical choice of



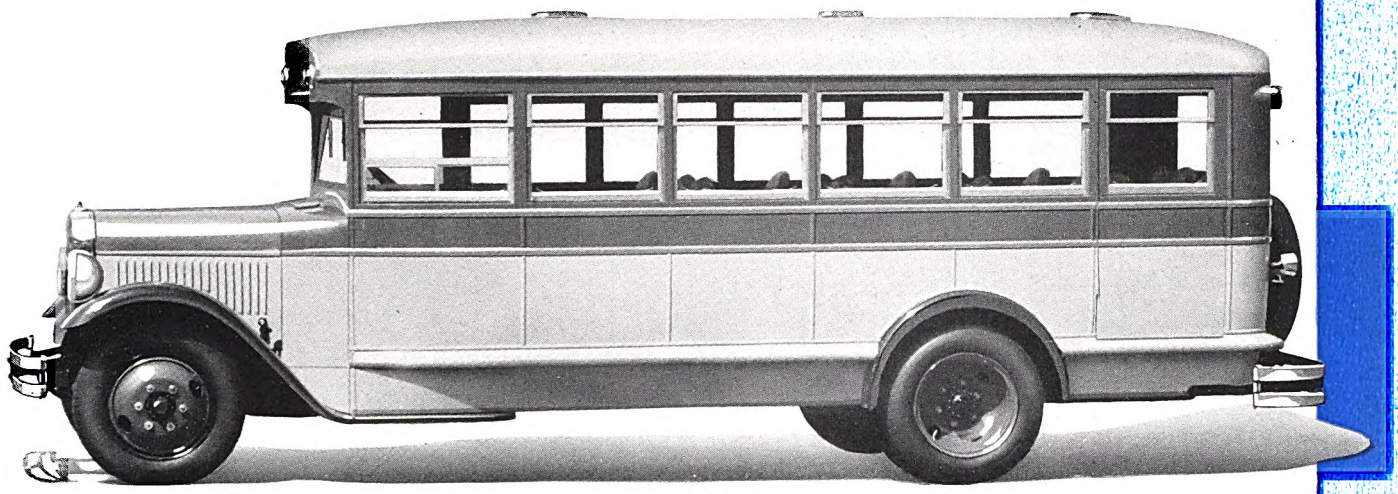
INTERIOR OF STREET CAR. *Ample aisle space, head-room and leg-room provided. Seats and seat backs of deep spring construction, upholstered in genuine leather. Non-rattling windows easily raised to provide 14" opening. Haskelite roof. Entrance door of two-leaf folding type—operated from driver's seat. Emergency door at rear. Three ventilators in roof. Six dome lights.*



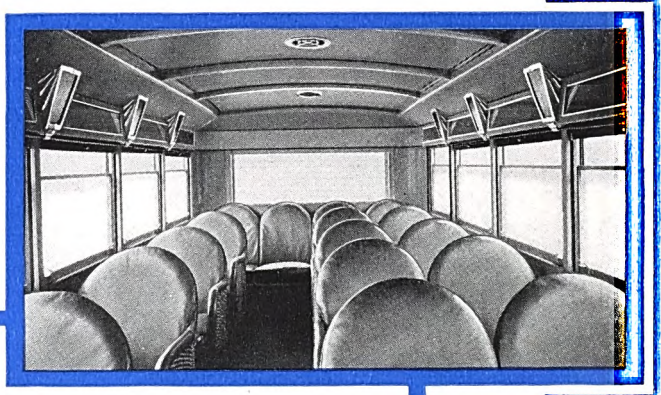
REAR AXLE *of the full-floating, spiral bevel type with double roller wheel bearings and electric-furnace cast steel housing. Weight of coach and load is carried on housing—shafts are free to transmit power solely. Greater dependability is assured.*

FRONT VIEW. *Showing wide clear-vision windshield, large destination sign-box, rugged front bumper, large radiator and attractive appearance in every blended line and detail of design. Front end is a steel structure, amply reinforced, riveted, gussetted and welded to provide maximum strength.*

Digitized by Google

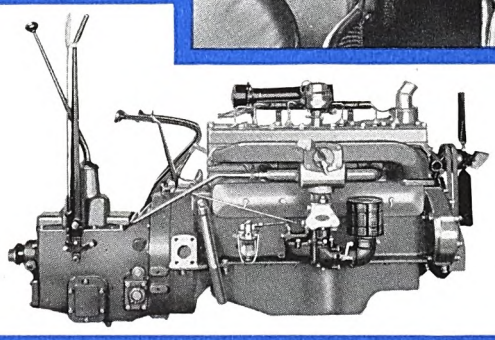


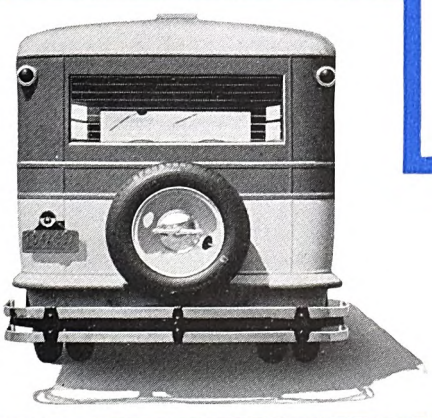
operators whose needs do not require the more advanced features and greater capacity provided in the "8" Series types. » » A few of the many features of these modern, practical "6" Series Coaches are illustrated and described below. Brief specifications will be found on the following page. For additional information write to Fargo Motor Corporation, Detroit, Mich.



INTERIOR OF PARLOR COACH. *Seats of the chair type, of steel tube framework, covered with wicker woven from fibre which will not crack, splinter or break. Detachable leather seat-back covers. Non-rattling windows that can be raised to provide 13" opening. Entrance door of one-piece type, operated from driver's seat. Emergency door at rear. Ten lights, designed in modernistic style and mounted along sides above windows.*

ENGINE *is 6-cylinder and develops 96 horsepower at 3000 R.P.M. The sturdy 4-speed transmission provides the needed flexibility for traffic or open road.*





REAR VIEW OF PARLOR COACH. *Note the sturdy bumper, and the guard rail that protects body at rear as well as on sides. Rear window is fitted with wire-reinforced glass. Chromium-plated baggage rack on roof with ladder at rear is provided if desired.*

Digitized by Google

FARGO
BUILT BY CHRYSLER MOTORS

CHASSIS SPECIFICATIONS

ENGINE: Type—L-Head; Number of Cylinders—6; Bore—3⅝"; Stroke—5"; Piston Displacement—309.63 cu. in.; Maximum Brake H. P.—96 at 3000 R.P.M.; Torque—200 ft. lbs. at 1100 R.P.M.; Suspension—Four Point; Mounting—Front, Spring Type; Rear, Rigid.

CYLINDERS & CRANKCASE: Cast—Integral; Cylinders—En Bloc; Finish of Bore—Reamed and Honed; Cylinder Head—Detachable; Oil Passages—Drilled in Block.

PISTONS: Type—Ventilated Bridge, Split Skirt; Material—Aluminum Alloy; Special Steel Strut; Rings—4 Compression, 1 Oil.

CRANKSHAFT: Material—Drop Forged Special Steel; Weight—100 Pounds; Length—36 3/32"; Balanced—Statically and Dynamically; Number of Main Bearings—7; Total Length—11¾"; Total Bearing Area—96.90 sq. in.

FLY WHEEL: Balanced—Statically and Dynamically; Starting Gear—Steel ring shrunk on flywheel.

CAMSHAFT: Type—Cams and Gears Integral; Material—Drop Forged Alloy Steel; Number of Bearings—4.

VALVES: Type—Poppet; Location—Right Side of Cylinder Block; Material—Nickel Chromium Steel; Guides—Removable.

VALVE TAPPETS: Type—Mushroom; Material—Cold Drawn Carbon Steel; Head—Chilled Cast Iron Welded to Stem.

ENGINE LUBRICATION: Type—Forced Feed; Oil Pump—Gear Type; Drive—Camshaft; Pressure to Main, Connecting Rods and Camshaft Bearings and to Front End Drive; Positive Spray to Pistons, Cylinder Walls, Cams, Valve Stems and Tappets; Oil Pan—Electro Galvanized Pressed Steel; Capacity—8 Quarts; Crankcase Ventilator; Oil Filter.

CARBURETOR: Type—Air Valve Updraft; Oil Wetted Wire Mesh Air Cleaner.

FUEL PUMP: Type—Variable Stroke Diaphragm; Location—Right Rear of Crankcase; Drive—Rocker Arm off Camshaft; Filter and Sediment Trap.

ENGINE COOLING: Type—Centrifugal Pump; Thermostat; Radiator—Tubular; Shell, Chromium Plated; Fan—4 Blade; Drive—Extension of Water Pump Shaft; Heat Indicator—On Instrument Panel; Capacity of Entire System—5¾ Gallons.

BATTERY: Heavy Duty; Number of Cells—6; Number of Plates—13; Capacity—120 Ampere Hours.

DISTRIBUTOR: Heavy Duty Type; Location—Top of Cylinder Head; Drive—Vertical Shaft Gear Driven off Camshaft; Advance—Full Automatic.

GENERATOR: Location—Left Side of Engine at Front; Type—Shunt Field Voltage Regulator; Drive—2 Vee Belts Driven from Crankshaft; Mounting—Hinged for Adjustment of Driving Belts; Capacity—225 Watt; Voltage—12; Charging Rate—Hot, 12 Amps.—Cold, 16 Amps.

STARTER: Type—Positive Shift Two-Stage; Location—Left Side of Motor on Flywheel; Normal Speed of Turning Engine—100 R.P.M.

CLUTCH: Location—Unit with Power Plant; Type—Dry, Single Plate; Plate Diameter—13"; Release Mechanism—Graphite Composition; Pilot Bearing—Ball Bearing.

TRANSMISSION: Type—Selective Sliding Gear, Heavy Duty; Location—Unit with Power Plant; Number Speeds Forward—4; Number Speeds Reverse—1; Main Shaft—Ball Bearing; Countershaft—Roller Bearing; Main Shaft Pilot Bearing—Roller; Idler Shaft—Bronze Bushing (Run in Oil).

PROPELLER SHAFT: Type—Two Piece Tubular; Diameter—3"; Center Bearing—Self Aligning.

UNIVERSAL JOINTS: Type—Cross and Trunnion; Location—Transmission, Rear of Center Bearing and Rear Axle.

EMERGENCY BRAKE: Location—Rear of Center Bearing; Type—Ventilated Disc; Disc Diameter—14"; Total Braking Area—44.4 sq. in.

SERVICE BRAKES: Location—4 Wheels; Type—Hydraulic Internal Expanding; Control—Foot Pedals, Booster Actuated; Drum Diameter—Front, 16"—Rear, 16"; Lining—American Brakeblok; Width of Lining—Front, 2½"—Rear, 3½"; Braking Area—350.11 sq. in.; Drum Material—Cast Iron.

WHEELS: Type—Metal Disc, Dual Rear, 6 Mounting Studs; Rim Size—20x6 DT.

TIRES: Parlor Car—7.00/20 8-ply Dual; Street Car—7.50/20 8-ply Dual, Spacing 9".

FRONT AXLE: Type—Reverse Elliott I-Beam; Wheel Bearings—Double Tapered Roller.

REAR AXLE: Type—Full Floating; Housing—Banjo Type; Housing Material—Electric Furnace Steel Casting; Drive Gears—Spiral Bevel with Straddle Mounted Pinion; Number of Bearings Entire Axle—9.

SPRINGS: Type—Semi-Elliptic; Material—Silico Manganese High Forging Spring Steel; Number of Leaves—Front, 10—Rear, 11; Width—Front, 3"—Rear, 3½"; Length—Front, 42"—Rear, 56⅛"; Shackles—Shackles and Bushings.

FRAME: Type—Pressed Steel Channels, Double Drop; Thickness of Material—3/16"; Maximum Depth—9 13/16"; Maximum Width Flanges—3¼"; Number of Outriggers—6; Number of Cross Members—7.

STEERING: Type—Worm and Sector; Ratio—Varying Ratio, 20:1; Steering Wheel—All Metal Steel Tube, 19" Diameter.

ROAD CLEARANCE: Parlor Car—Front, 8½"; Rear, 8⅞". Street Car—Front, 8¾"; Rear, 9⅛".

TURNING RADIUS: Left 28' ¾", Right 29' 1½".

WHEEL BASE: 165 inches.

WHEEL TREAD: Front, 64¼"; Rear 66¾".

FUEL TANK: Location—Outside of Frame on Right Side; Material—Rust Proof Terne Plate; Capacity—40 Gallons.

BUMPERS: Street Car—Heavy-duty Spring Type Front; Parlor Car—Heavy-duty Spring Type Front and Rear.

CHASSIS LUBRICATION: Zerk High Pressure Grease Gun.

CONTROL: Brake and Gear Shift Levers—On Transmission Case; Horn Button—On Steering Wheel; Throttle, Choke and all Electric Control Switches on Instrument Board with Exception of High and Low Beam Headlamps, Switch for which is located on Left Side of Toe Board.

BODY SPECIFICATIONS

FRAMEWORK: Framework is of second growth thoroughly seasoned oak. Oak body pillars are mortised, glued and screwed to the roof rail and anchored by malleable brackets on each side. Brackets also rigidly join the carlines to the roof rail and pillars. All wooden parts are thoroughly treated with lead and oil and non-rusting screws are used throughout.

FRONT END: Front end is a steel structure consisting of structural steel angle corner pillars which are reinforced with gussets, riveted and welded, for maximum strength. A similar type steel framework supports the cowl and windshield.

SKIRTING: Skirting is reinforced with brackets bolted to the floor and pillars, and riveted to the angle iron extending entire length of body which rests on chassis outriggers.

SKID RAIL: Sides and rear of body are protected with heavy oak skid rail.

SIDE PANELS: Street Car—Heavy-gauge metal panels are installed in sections and the upper panels overlap those immediately below. Inner surface of panels are painted and interior of body lined with plywood. Parlor Car—Plymetal panels without interior lining.

ROOF: Haskelite, covered with wadding and thoroughly waterproofed duck.

FLOORING: 1⅛" yellow pine, tongue and groove, laid crosswise and covered with 3/16" battleship linoleum.

WINDSHIELD: One piece stationary, sloping type with heavy plate glass set in Bonderized steel sash. 2-blade windshield wiper.

WINDOWS: Raised type with satin nickel finished brass sash and equipped with anti-rattlers; fixed upper transoms. Glazed with double strength glass. Window at left of driver fitted with sliding panel for signalling purposes. Rear windows are stationary and fitted with wire reinforced glass.

STEP: All metal with non-skid safety tread.

SIGNAL SYSTEM: Bell cord.

HEATING SYSTEM: Approved circulating hot air type.

LIGHTING: Exterior—2 marker lights front and rear. Interior—Street Car, 6-21 c.p. dome lights; Parlor Car, 10-15 c.p. dome lights.

ADVERTISING RACK: Street Car: Accommodating standard advertising cards located on each side and across rear above windows.

DESTINATION SIGN: Hunter roller type accommodating two lines of destination names.

GRAB RAILS: Street Car: One stanchion at left of entrance door and one behind driver's seat. Grab rails located on ceiling at each side of aisle.

BATTERY: Enclosed in wooden box located at left of driver's seat.

TOOL BOX: Street Car: Under right front longitudinal seat. Parlor Coach: Under rear seats.

REAR VIEW MIRROR: Mounted above destination sign trap door.

GENERAL DIMENSIONS:

	Street Car	Parlor Car
Overall length of body	221½"	214½"
Overall width	94"	85¼"
Inside width	87¾"	76"
Inside height	76"	67¾"
Seat spacing	30"	31"
Seat width	34"	37"
Aisle width between seat backs	22"	
Aisle width between seat cushions	18"	15"
Width of entrance in clear	27"	28"

FARGO MOTOR CORPORATION

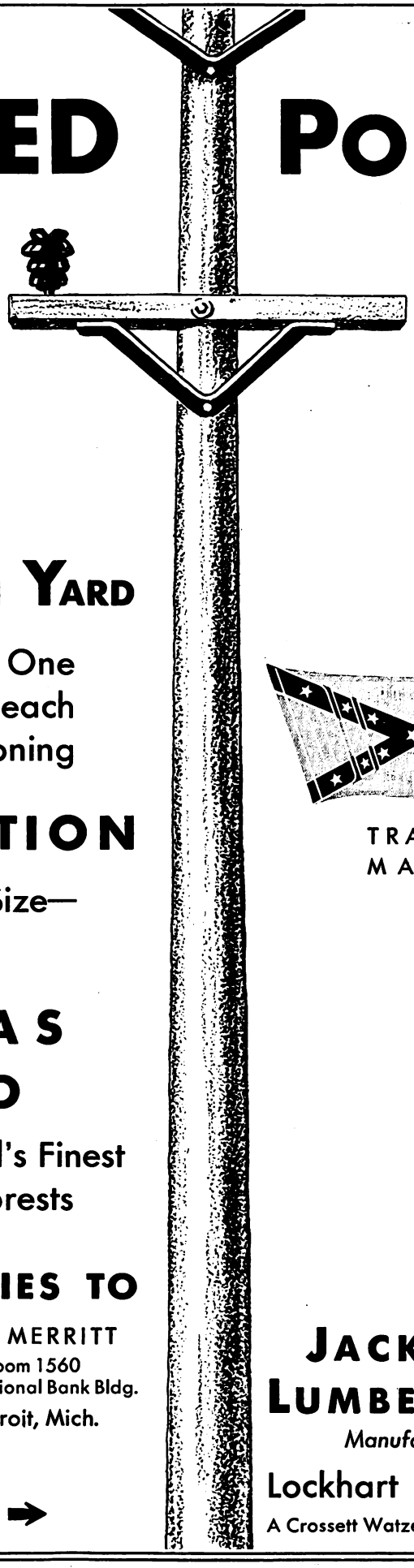
DETROIT, MICHIGAN

A DIVISION OF CHRYSLER CORPORATION

Digitized by Google

B-1368 PRINTED IN U.S.A.

SEASONED POLES



You See, Buyers . . .
It's All In The Way
We Handle Stock

for instance

BIG CONCENTRATION YARD

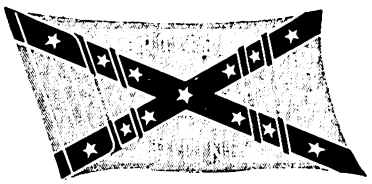
Stock stored in Units of One Car Load to the Stack, each dated for thorough seasoning

CLOSE INSPECTION

For Uniform Grade and Size—
and always

SHIPPED AS SPECIFIED

From the Heart of the World's Finest Long Leaf Yellow Pine Forests



TRADE MARK

SEND YOUR INQUIRIES TO

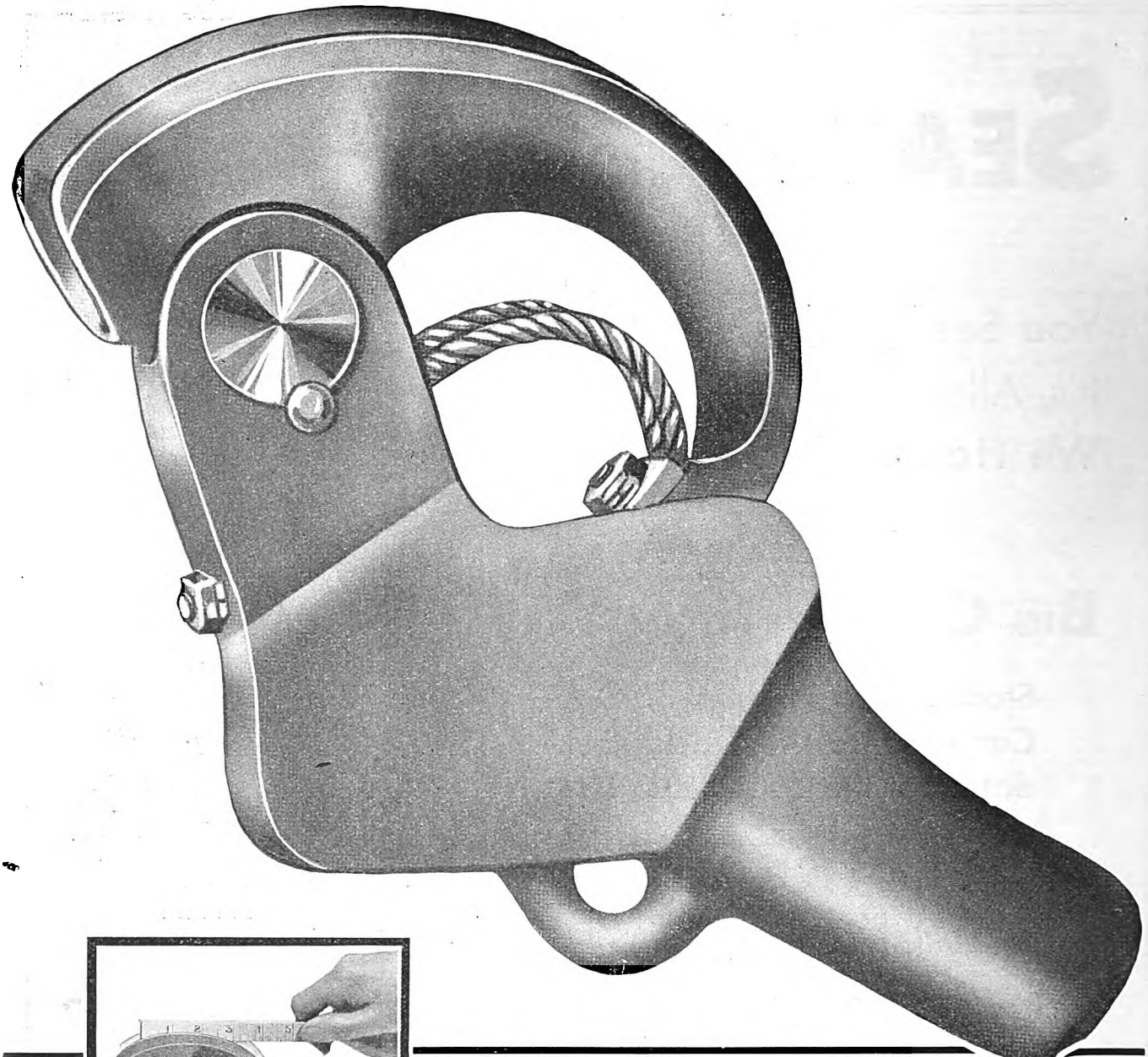
ROB'T W. FORBES
Room 2845
Grand Central Terminal
New York City

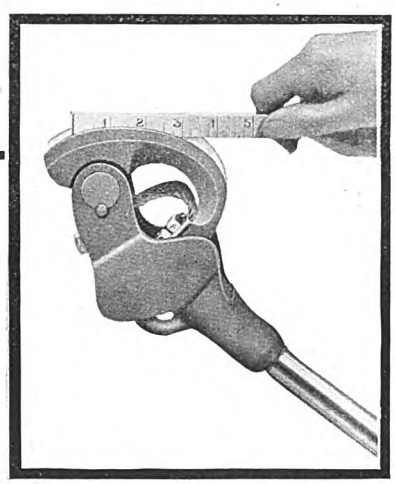
F. B. MERRITT
Room 1560
First National Bank Bldg.
Detroit, Mich.

Our Selling Agents
OR DIRECT TO ➡

JACKSON LUMBER CO.
Manufacturers
Lockhart - Ala.
A Crossett Watzek Gates Industry

Digitized by Google





3 INCHES OF SMOOTH SLIDING CONTACT

This picture tells the story better than words. It's easy to see what three inches of smooth sliding contact means . . . steady power . . . no dewirements . . . no arcing . . . no burning of wire . . .

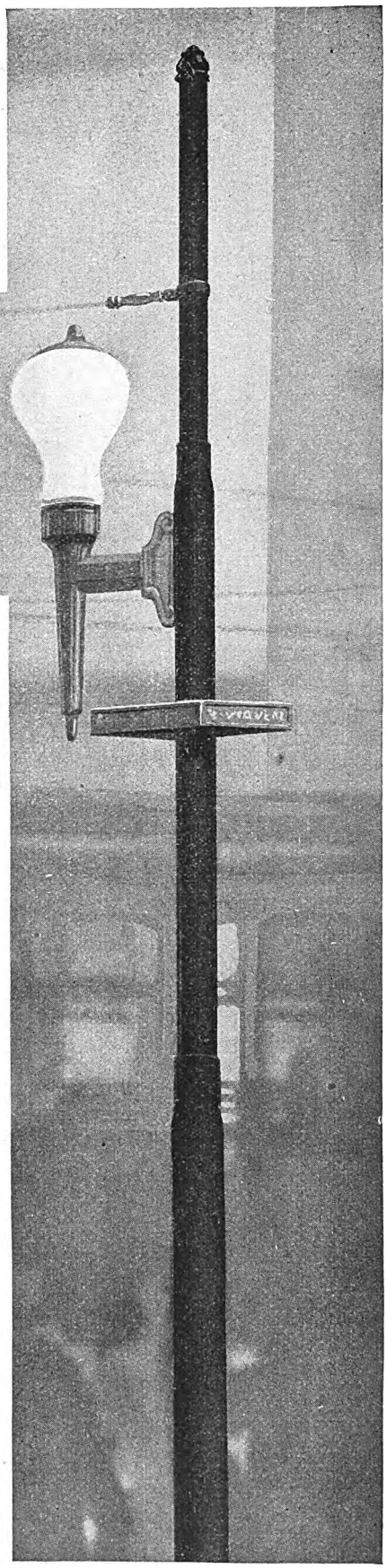
MILLER TROLLEY SHOES

Here is almost the smoothness and the perfect contact of the pantograph collector, applied in a practical, inexpensive way to the ordinary trolley. Miller Trolley Shoes fit any standard trolley pole. They have been used for years on several well-known properties. Test them—and form your own conclusions. Sample for trial sent on request of any responsible official.

MILLER TROLLEY SHOE CO.
Columbia Road, Boston 21, Mass.

Digitized by Google

STRENGTH SAFETY *and* APPEARANCE



TUBULAR STEEL POLES

HERE is a unique combination in one pole—the three most important factors in line pole service . . . strength, safety and appearance. These three advantages offer maximum durability, adequate protection to the public, and advancement of the "city beautiful" idea—making the selection of NATIONAL Poles a most desirable investment from every standpoint.

Made by the largest manufacturer of wrought tubular products in the world, with facilities for meeting a wide range of specifications for pole construction. Ask for Bulletin No. 14, describing NATIONAL Tubular Poles, made from—

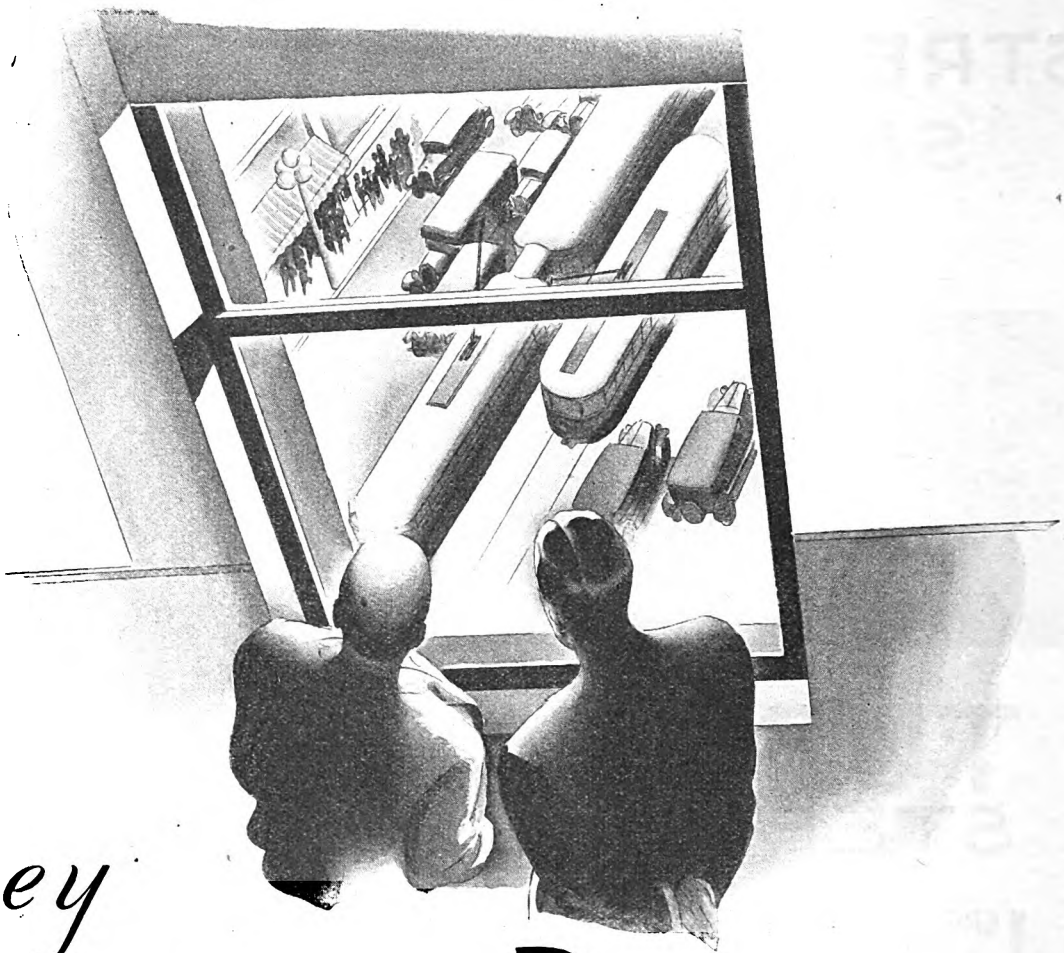
America's Standard Wrought Pipe

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

U·S STEEL

NATIONAL

Digitized by Google



They don't have to REMEMBER

CARNEGIE STEEL TIES

after their installation

TRACK problems may properly be forgotten where Carnegie Steel Ties are used in track construction. These ties provide the foundation for a smooth, repair-free track—a track that saves wear and tear on rolling equipment and greatly enhances its comfort. In many instances where Carnegie Ties have been in service for fifteen or twenty years, rails have been taken up for renewal to find the ties in perfect condition.

Plan to include Carnegie Steel Ties in your track construction program. Their unit cost (cost per foot of track per year) is considerably less than for wood ties. They will prove an investment you will remember with satisfaction—and forget with complacency, as far as troubles are concerned.

Catalogue on request.

CARNEGIE STEEL COMPANY

Subsidiary of United States Steel Corporation

PITTSBURGH PENNA.

86

Digitized by Google

J-M Brake Blocks are making unusual performance records on Bus Lines . . .

MORE than 650,000 safe, quick, quiet stops is an unbelievable record for any braking material. Yet the J-M Brake Blocks shown in the photograph below made this record in 25,000 miles of service . . . and this set of blocks is still good for thousands of miles additional cost-free braking service.

This is not an isolated record of the money-saving, safe service that J-M Brake Blocks give the bus operator. More than sixty companies have tested this friction material with uniformly successful results.

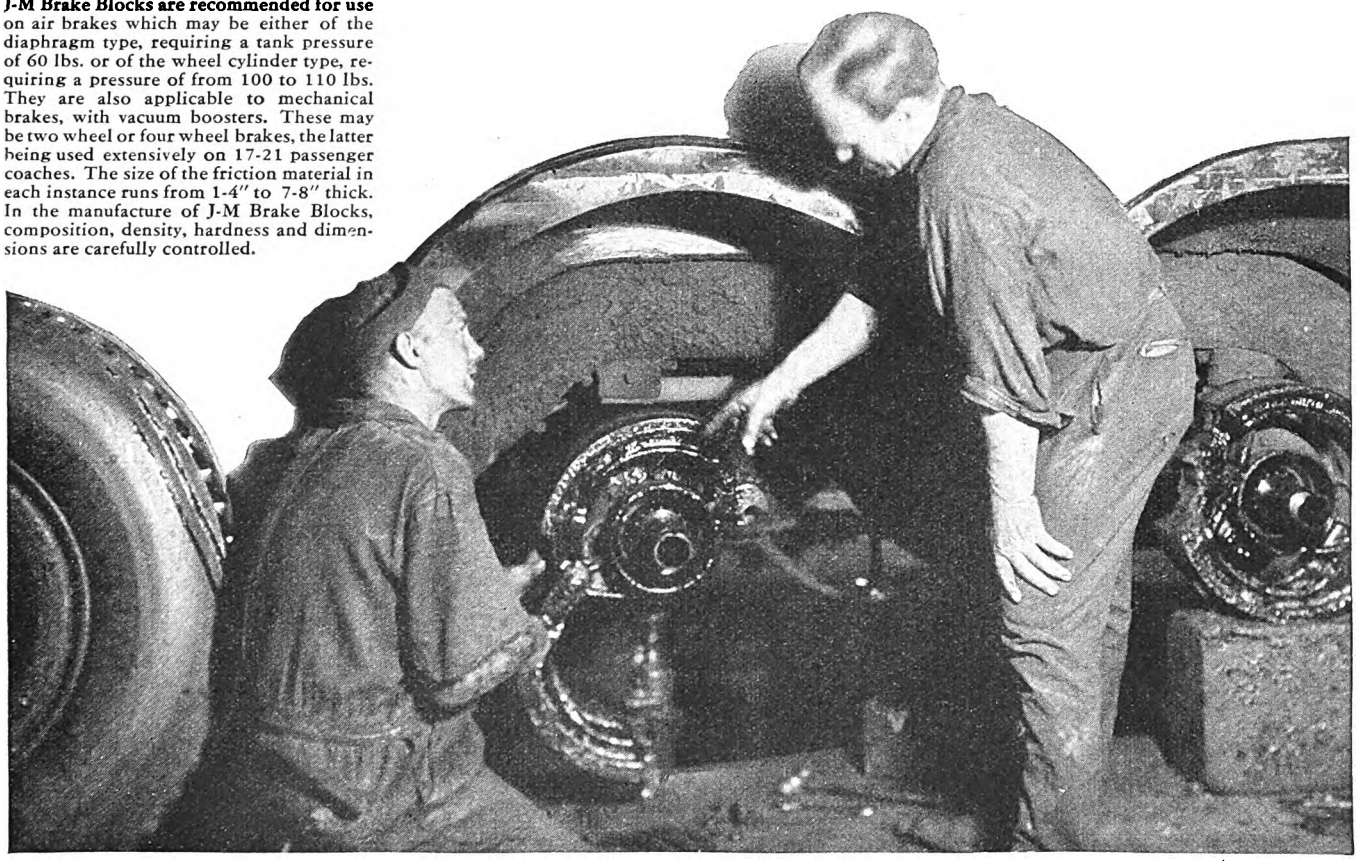
J-M Brake Blocks, adaptable to many types of equipment, have been specially designed to meet the operating conditions of modern bus service.

J-M Brake Blocks, made of moulded asbestos, resist the action of oils and greases. They reduce costs by giving thousands of miles of extra service, by reducing shop time for adjustments, by increasing tire life through smooth gripping and by eliminating road delays. J-M Brake Blocks provide quiet and positive braking action. They allow higher running speeds and quicker stopping with absolute safety. They are particularly recommended for use on alloy or high-carbon drums.

From the standpoint of safety, efficiency and reduced cost of operation we ask that you test this J-M friction material. The coupon will bring you further information and performance facts.

J-M BRAKE BLOCKS
FOR BUSES AND TRUCKS

J-M Brake Blocks are recommended for use on air brakes which may be either of the diaphragm type, requiring a tank pressure of 60 lbs. or of the wheel cylinder type, requiring a pressure of from 100 to 110 lbs. They are also applicable to mechanical brakes, with vacuum boosters. These may be two wheel or four wheel brakes, the latter being used extensively on 17-21 passenger coaches. The size of the friction material in each instance runs from 1-4″ to 7-8″ thick. In the manufacture of J-M Brake Blocks, composition, density, hardness and dimensions are carefully controlled.



BUS & CAR INSULATION · REFRACTORY & INSULATING CEMENTS · FIBRE CONDUIT · ASBESTOS EXHAUST PIPE COVERING · ASBESTOS SHINGLES
PACKINGS · TRANSITE · BUILT-UP & READY-TO-LAY ROOFING · ASPHALT PLANK · TILE FLOORING · POWER PLANT INSULATIONS
MASTICOKE & TRUSS PLATE FLOORING · ELECTRICAL INSULATING MATERIALS · FRICTION TAPE · BRAKE BLOCKS & LININGS

Johns-Manville
SERVICE TO TRANSPORTATION

Address JOHNS-MANVILLE
292 Madison Ave. New York City *or* 159 New Montgomery St. San Francisco
or Toronto, *Canada*

Please send me further information about your Brake Blocks.

Name.....

Address.....

City.....*State*.....

SB-115-12

Digitized by Google

COMING — *in January*

Statistics of City and Interurban Electric Railways and Electrified Steam Lines

(As of January 1, 1931)

	Number of Operating Companies	Miles of Track	Passenger Cars		Electric Locomotives	Freight Cars		Service Cars	Buses Operated	Miles of Bus Route
			Motor	Trailer		Motor	Trailer			
New England States										
Connecticut										
Maine										
Massachusetts										
New Hampshire										
Rhode Island										
Vermont										
Eastern States										
Delaware										
District of Columbia										
Maryland										
New Jersey										
New York										
Pennsylvania										
Virginia										
West Virginia										
Central States										
Illinois										
Indiana										
Iowa										
Kentucky										
Michigan										
Minnesota										
Missouri										
Ohio										
Wisconsin										
Southern States										
Alabama										
Arkansas										
Florida										
Georgia										
Louisiana										
Mississippi										
North Carolina										
South Carolina										
Tennessee										
Western States										
Arizona										
California										
Colorado										
Idaho										
Kansas										
Montana										
Nebraska										
North Dakota										
Oklahoma										
Oregon										
South Dakota										
Texas										
Utah										
Washington										
Wyoming										
U. S. Total										
U. S. Possessions										
Canada										
Grand Total										

Annual Statistical and Progress Number

up-to-date figures on every important phase of the industry — with interpretations and forecasts of 1931 trends

An issue you'll want to study!

ELECTRIC RAILWAY JOURNAL

Digitized by Google

unusual **PROGRESS** *in maintenance methods wins national recognition for* **COMMUNITY TRACTION CO.**

HIGHLY efficient management and dependable equipment proved major factors in winning the Bus Transportation Maintenance Award for the Community Traction Company, Toledo, Ohio.

As a result, this line has gained national recognition and has gone far to bring about better service methods. It is a tribute to Goodrich performance that Silvertowns are 100% tire equipment.

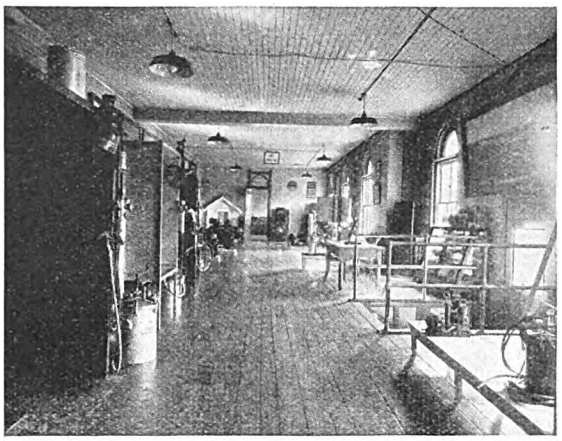
The B. F. Goodrich Rubber Co., Est. 1870, Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ont. The International B. F. Goodrich Corporation (Export).

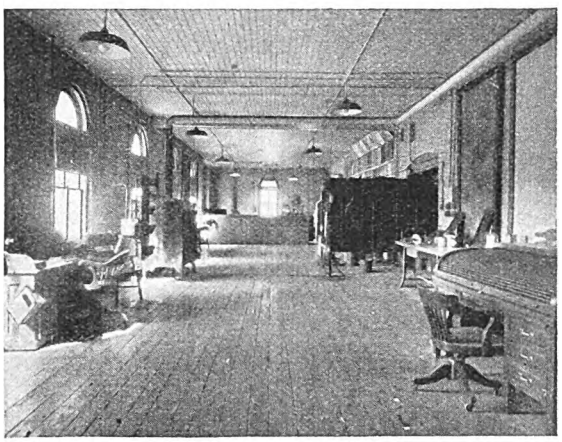
Goodrich HEAVY DUTY Silvertowns

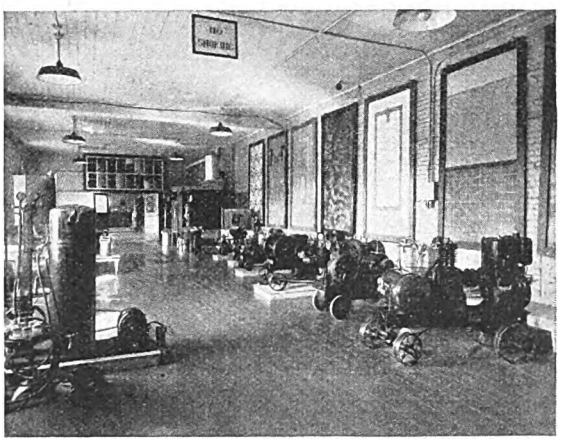
SPECIFY GOODRICH ON YOUR NEW BUSES

Digitized by Google

A Spray Equipment Training School





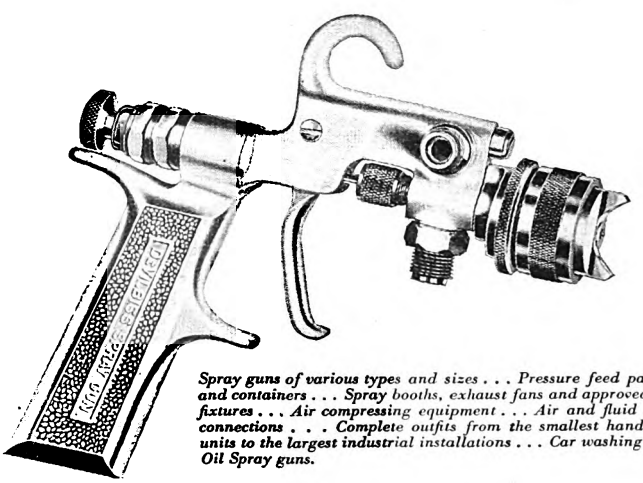


The photographs show parts of the various DeVilbiss schoolrooms in which students are trained free in the use of spray-painting and spray-finishing equipment.

Many of the most expert spray-painting and spray-finishing equipment operators were thoroughly trained free in the extensive school maintained by the DeVilbiss factory organization. Any user of DeVilbiss spray equipment may come to this school or send his men to it. There is no charge or fee. The student pays only his own living expenses.

Industrial finishing, interior decorating, house painting, the use of specialized equipment made for a particular task, the proper use of all the many materials which are applied with a spray gun—in fact every phase and detail of spray-painting and spray-finishing operations are completely and thoroughly taught. When he leaves the school, the student is a practical and skilled operator, trained to do the work he will undertake on his own job, or organize, direct and teach others.

Many of the largest electric railways have found that it pays to have their operators trained in the DeVilbiss school.



***Spray guns of various types** and sizes . . . Pressure feed paint tanks **and containers** . . . **Spray** booths, exhaust fans and approved lighting **fixtures** . . . **Air compressing** equipment . . . Air and fluid hose and **connections** . . . **Complete** outfits from the smallest hand-operated **units to the largest industrial** installations . . . Car washing guns . . . Oil Spray guns.*

DeVilbiss

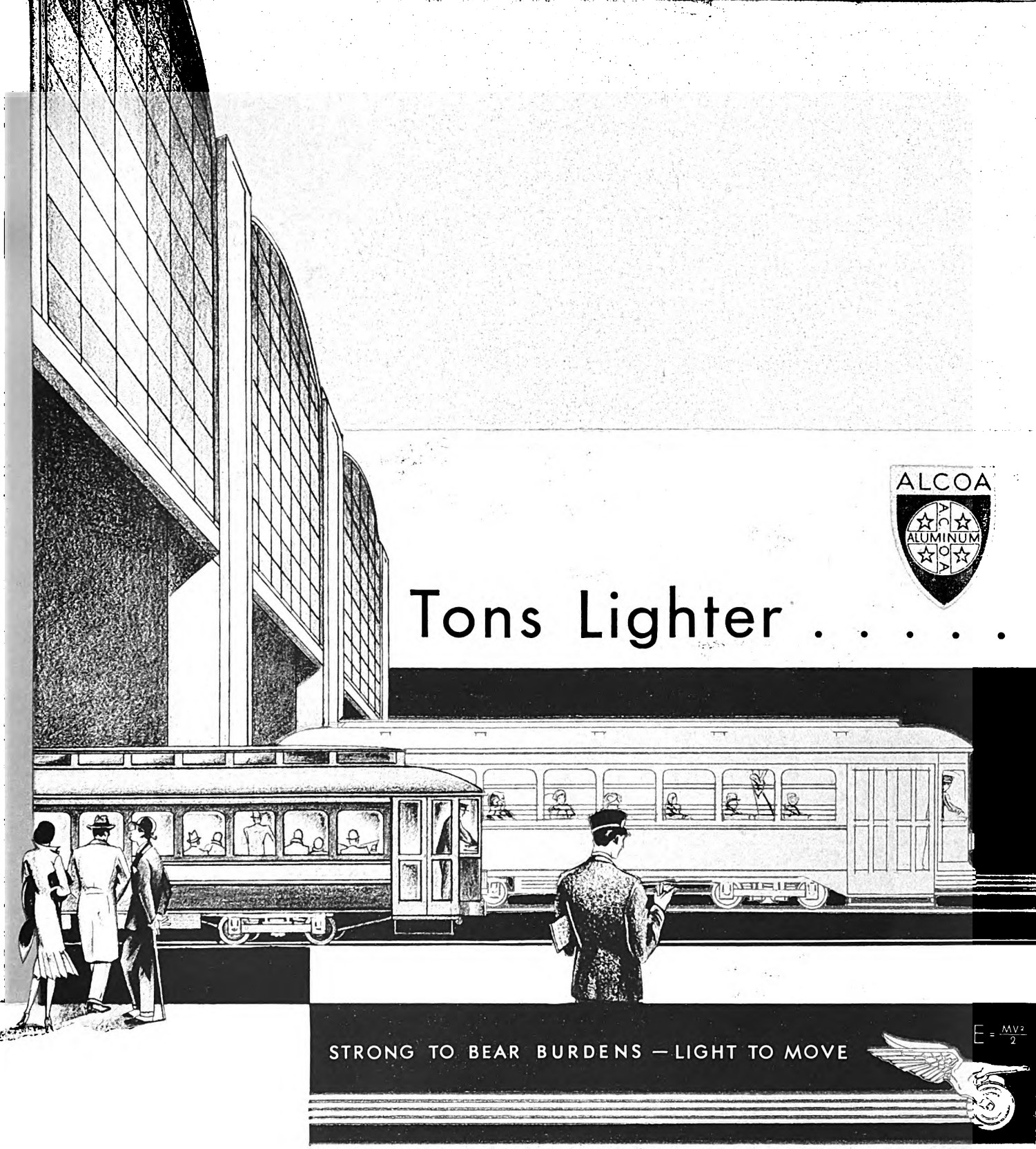
THE DEVILBISS COMPANY · TOLEDO, OHIO

Sales and Service Branches

NEW YORK PHILADELPHIA CLEVELAND DETROIT INDIANAPOLIS CHICAGO
ST. LOUIS LOS ANGELES SAN FRANCISCO WINDSOR, ONTARIO

Direct factory representatives in all other territories

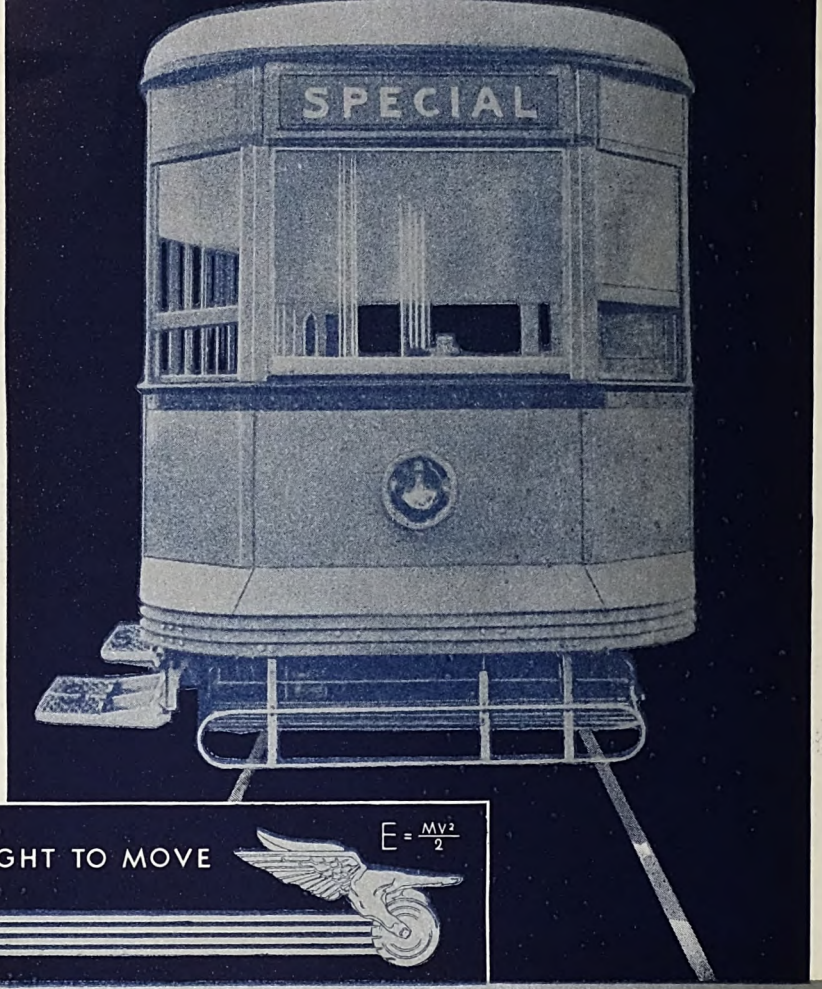
Digitized by Google



Aluminum Street Cars make Faster Schedules

ALCOA ALUMINUM

Digitized by Google



ALCOA

STRONG TO BEAR BURDENS — LIGHT TO MOVE

$E = \frac{MV^2}{2}$

10,000 Pounds of Alcoa Aluminum used 13,500 Pounds of Dead-Weight Saved

This car is over six tons lighter, because the light, strong Alloys of Alcoa Aluminum were used for the body and under-frame. It was built by the Cummings Car and Coach Company, for Chicago and Joliet Electric Railway Company.

Cars that are not handicapped by excessive dead-weight can make faster runs—collect more fares every day. Even with smaller, less expensive motors, using less power, cars built of the light, strong Alloys of Alcoa Aluminum are making speedier starts, quicker stops and much faster round trips. Every run they make costs less money, not only because there are thousands of pounds less to move, but also because there are thousands of pounds less weight pounding on tracks and road bed.

The car shown here has been in service since 1927. Many other cars of aluminum have been in service longer than that. They prove that Alcoa Aluminum has all the required strength, has great resistance to corrosion, and is more profitable to operate. They are both cheaper to maintain and they attract more fares.

The light, strong Alloys of Alcoa Aluminum are easily fabricated in any standard shape. They require technique and equipment very similar to that needed for working steel.

Our nearest office will gladly send a representative to talk with you about the use of Alcoa Aluminum and its light, strong Alloys for car construction. Address ALUMINUM COMPANY *of* AMERICA; 2463 Oliver Building, PITTSBURGH, PENNSYLVANIA.

ALCOA ALUMINUM

Digitized by Google

Over 2 years service under 8,000,000 heavy wheels

Measuring the amount of wear on the Bethlehem Silico - Manganese Crossing at 12th and Market Streets, Philadelphia, Pa.

BETHLEHEM Silico-Manganese Crossings Design 999 are especially suitable for heavy traffic locations. The crossing installed at 12th and Market Streets, Philadelphia, Pa., has given more than 2 years of trouble-free service under the mass traffic conditions at this busy intersection. Not withstanding this heavy service it has not been necessary to repair this crossing or build it up by welding.

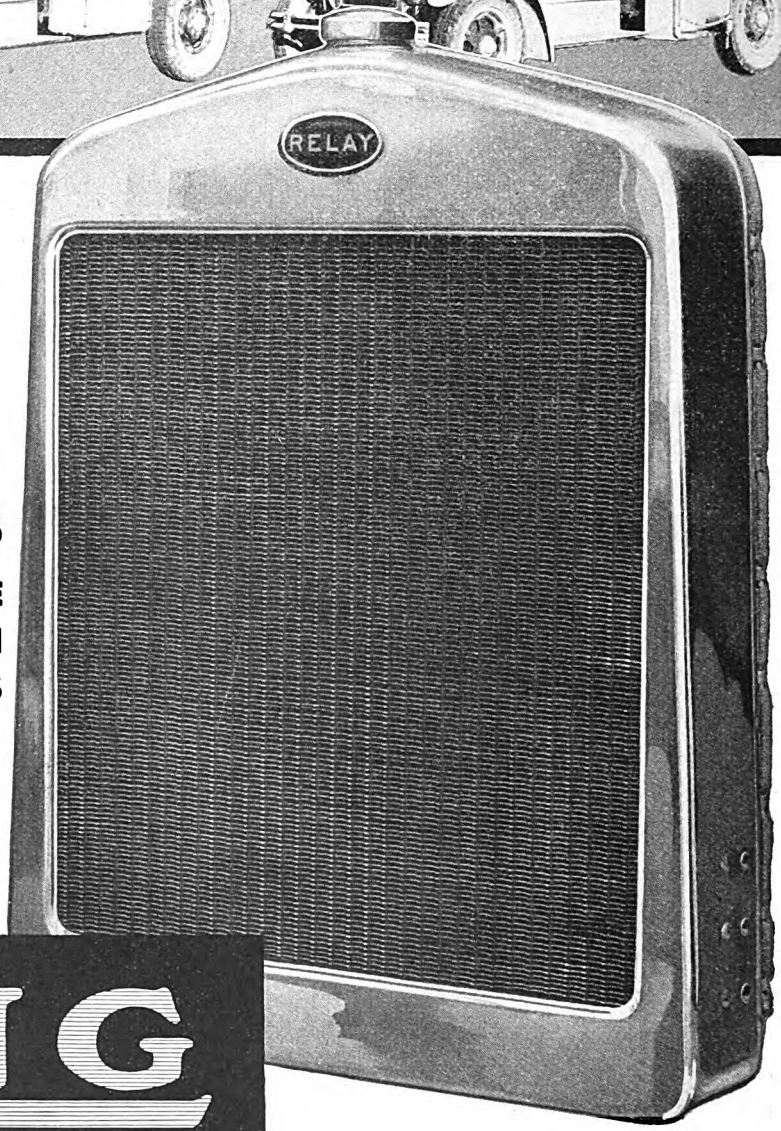
Bethlehem Silico-Manganese Crossings have the hardness and toughness to resist wear. The Silico-Manganese Castings are Thermit-welded to the rails, making a solid, one-piece construction and eliminating the use of cast iron or bolts. These castings are heat treated to harden them and increase their wearing qualities. It is this heat treatment that gives to Bethlehem Silico-Manganese Crossings their remarkable resistance to initial pounding and wear. They withstand great abuse and yet are easily repaired by welding.

BETHLEHEM STEEL COMPANY
General Offices: Bethlehem, Pa.
District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis
Pacific Coast Distributor: Pacific Coast Steel Corporation, San Francisco, Los Angeles, Portland, Seattle, Honolulu.
Export Distributor: Bethlehem Steel Export Corporation, 25 Broadway, New York City

BETHLEHEM
Silico-Manganese Crossings

Digitized by Google

RELAY TRUCKS DEPEND on LONG RADIATORS for Efficient Engine Cooling



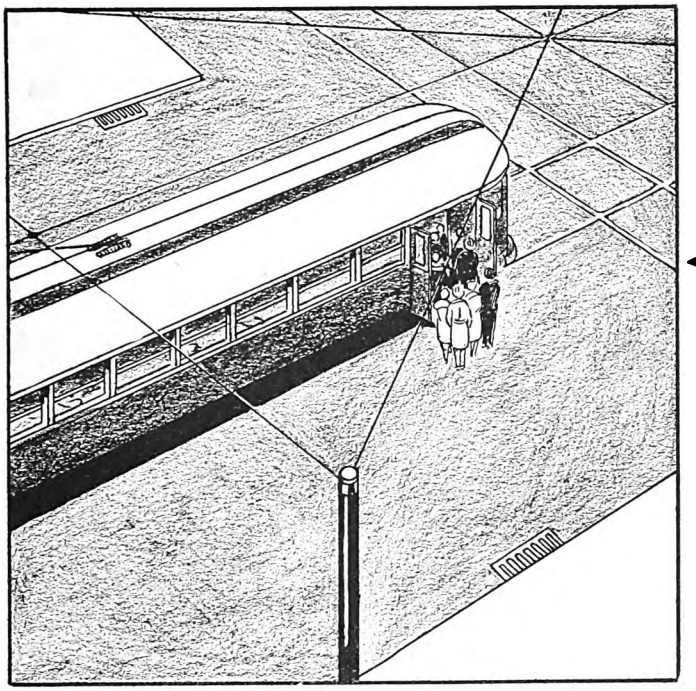
LONG PRODUCTS

AUTOMOTIVE CLUTCHES and RADIATORS

LONG

LONG MANUFACTURING COMPANY
Division of Borg-Warner Corporation
DETROIT, MICHIGAN

Digitized by Google



RIGHT *HERE* . . .

IS THE PLACE TO STOP TRANSFER ABUSE

Where the passengers are pushing and jamming, practically ignoring the conductor in their endeavor to secure the desirable seats. The conductor can glance at each transfer only a fraction of a second to determine its validity.

Is it:

Good on his car?
Correct time?
Correct day?
In or out trip?
A. M. or P. M.?

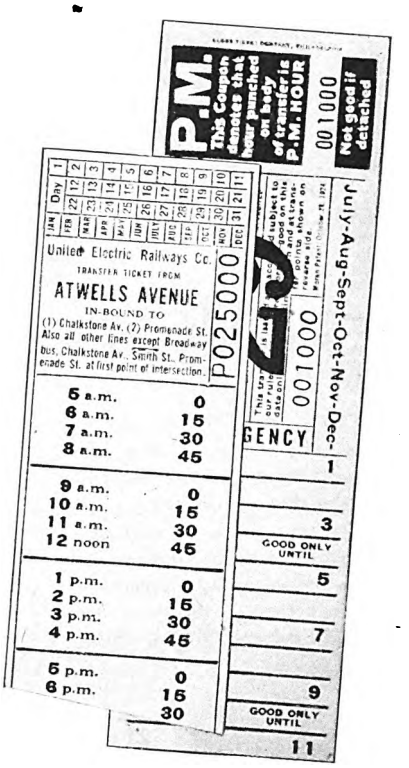
Changes in mode of living have necessitated many roads modernizing their transfer systems. Former methods were too slow, cumbersome and inaccurate.

That's why a carefully planned Globe Transfer System will reflect to advantage in your revenue. Write us today.

Globe
TICKET COMPANY
PHILADELPHIA

Factories:
Philadelphia Los Angeles Boston New York Jacksonville

Sales Offices:
Syracuse Cincinnati Pittsburgh
Baltimore Cleveland



Showing two types of transfers designed to accomplish the results outlined in text. *The size* of the torn-off transfer indicates hour issued.

Digitized by Google

Editors on WHEELS
—are making your business paper!

He's out—but he's not at the country club. His chair is empty this afternoon—but it won't be tonight. He'll be back from the front with important news for you and your business.

For today your business paper is edited on wheels.

Is there a hint of a new process, a new method, a new machine that may cut costs for a whole industry? Your editor is there by the shortest, swiftest route.

Is there a rumor of impending price changes—of a merger that may affect competition—a tariff that may affect exports? Your editor is on the ground, looking at emergencies through your eyes, getting the facts for you.

Is there news of a selling plan, a packaging idea, a distribution scheme that moves goods quickly? He is there, to appraise its value to you, to bring you the story of just what happened.

No wonder your editor is not at his desk. He is riding the rails, flying the airlines, touring the roads—a reporter at the front, an editor on the way home. And he is doing it all for you. His reports, digested for you, written for you, published for you—are yours in the pages of your business paper.

THIS SYMBOL *identifies an ABP paper . . . It stands for honest, known, paid circulation; straightforward business methods, and editorial standards that insure reader interest . . . These are the factors that make a valuable advertising medium.*

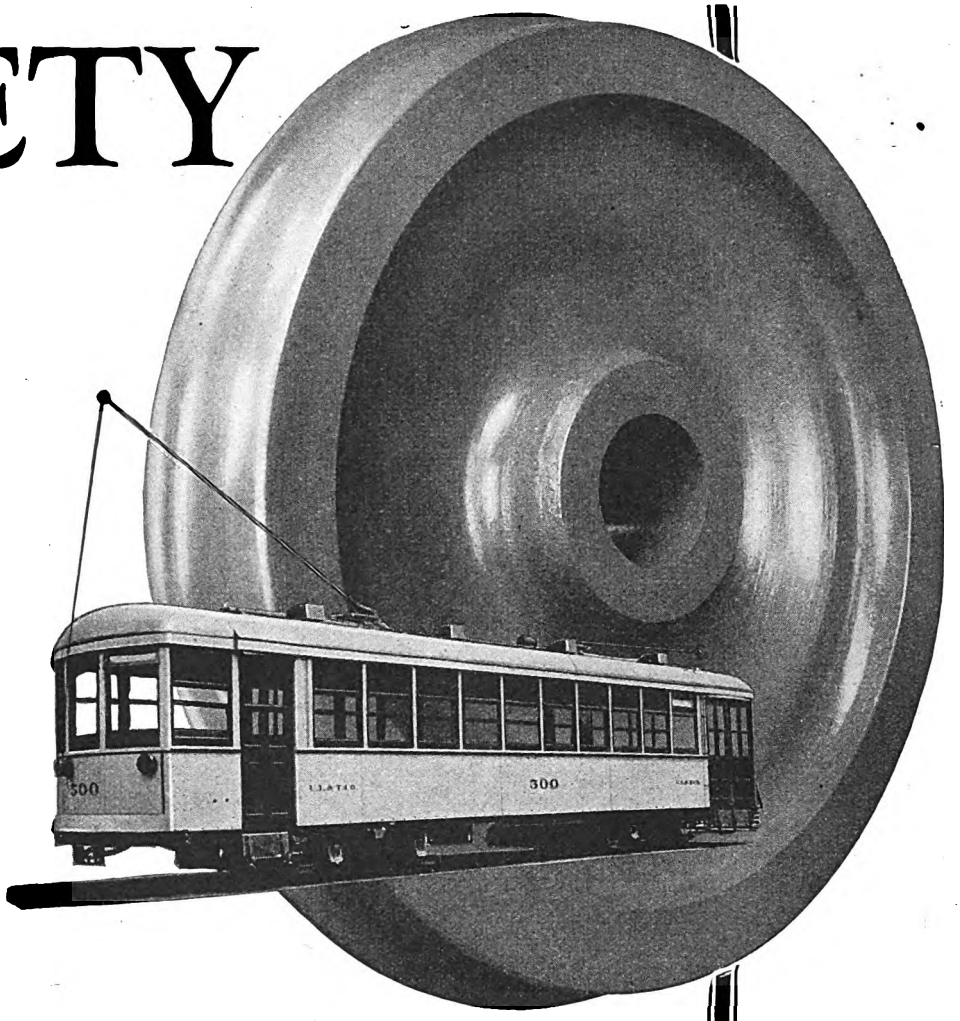
ELECTRIC RAILWAY JOURNAL IS A MEMBER OF

THE ASSOCIATED BUSINESS PAPERS, INC.

TWO-NINETY-FIVE MADISON AVENUE - NEW YORK CITY

Digitized by Google

SAFETY



NOTHING is so sure to cause a falling off in patronage and to put the interurban road in the red as interruptions to service and accidents.

"Standard" Steel Parts help to prevent both. Their greater dependability and strength assure the continued safe operation of electric cars by practically eliminating failure of vital wearing parts.

STANDARD STEEL WORKS COMPANY
GENERAL OFFICES AND WORKS: BURNHAM, PA.

Products

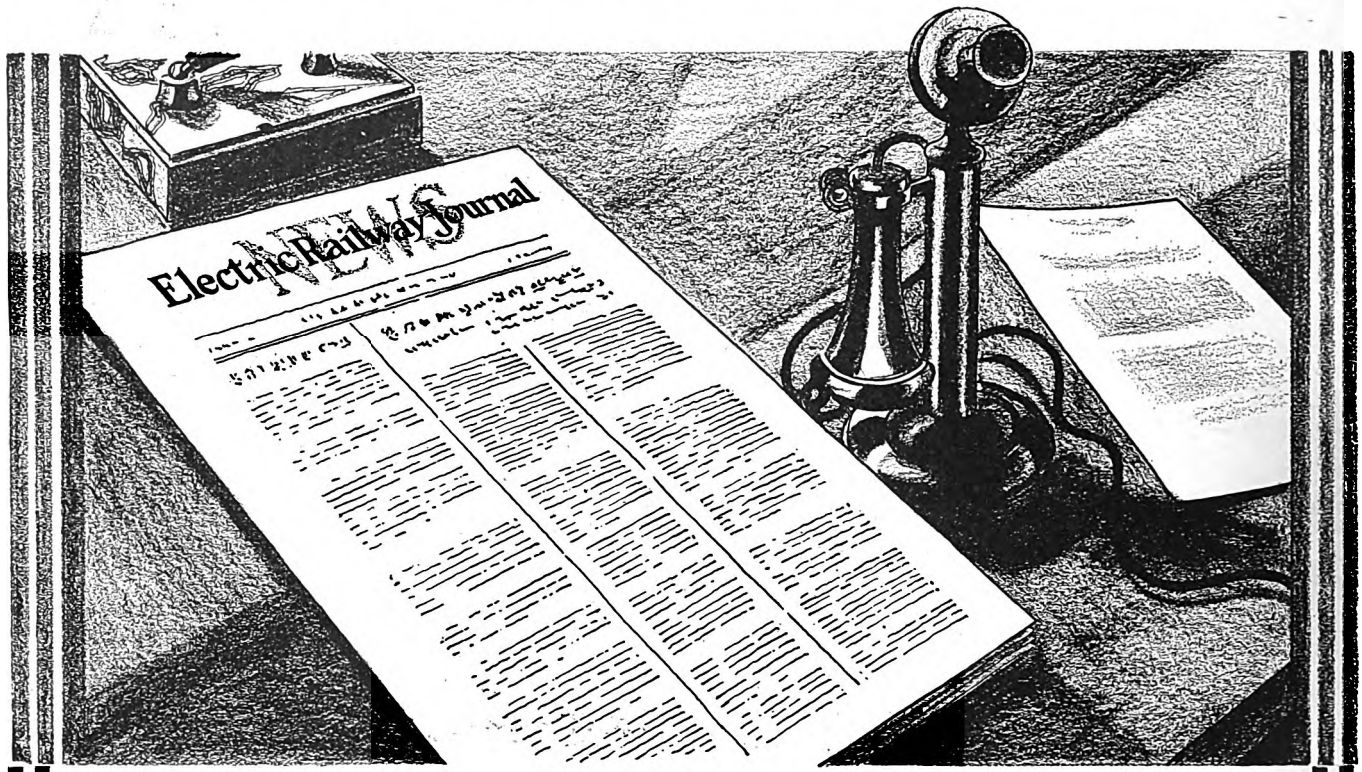
Steel Axles Steel Springs Armature Shafts Rolled Steel Wheels

SALES OFFICES:

New York Chicago St. Louis Richmond Portland San Francisco Philadelphia

Digitized by Google

Are you receiving *The Electric Railway Journal* NEWS?



—the Newspaper of the Electric Railway Field

When *Electric Railway Journal* was changed from a weekly to a monthly magazine, electric railway men everywhere asked us to continue to supply the current news of the field.

For that reason, a supplementary service was started, known as the *Electric Railway Journal* NEWS. It appears as a separate newspaper on thirty-nine Saturdays during the year. On the other thirteen Saturdays, the magazine itself appears with current news.

The *Electric Railway Journal* NEWS keeps its readers posted on court decisions . . recent bus developments . . current legislation enacted concerning electric railways . . changes in fare rates . . news of purchasing activities . . financial and corporate notes . . editorial interpretation of vital news . . personal items on men in the field. This newspaper constitutes the most complete guide to new developments in the field.

Subscription price is low—only $2 for the complete year's service of thirty-nine issues. Foreign rate, $4 annually. Sold in combination with the monthly edition of *Electric Railway Journal* for $5 a year, domestic rate. Send no money now—simply fill in and mail the coupon today!

ELECTRIC RAILWAY JOURNAL
10th Ave. at 36th St., New York

Enter my subscription to *Electric Railway Journal* NEWS. Bill me for $2.

Name .....

Address .....

City ..... State .....

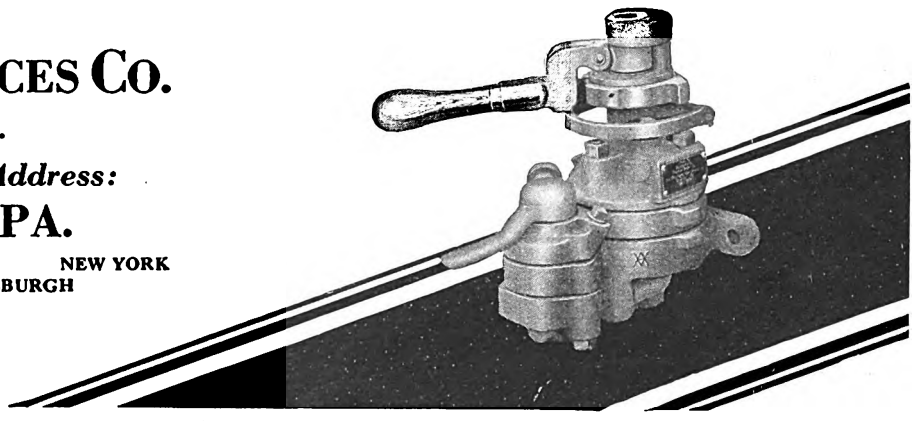
Company .....

Digitized by Google

The SAFETY CAR CONTROL EQUIPMENT

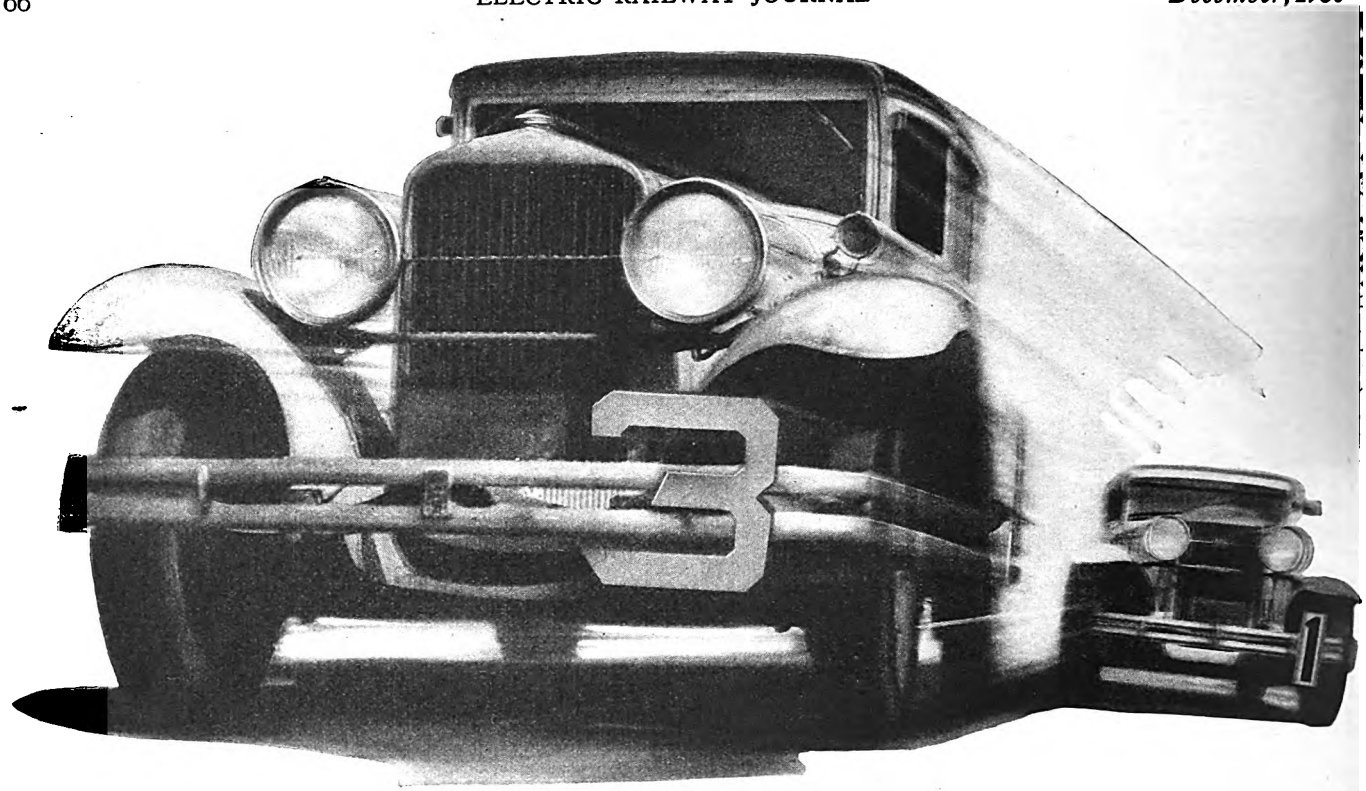
Speeds Transportation SAFELY

When conditions impel shorter headway to reduce waiting time of patrons . . . quicker brake applications to reduce stopping time . . . rapid interchange of passengers to cut down standing time . . . prompt release of brakes to permit quick get-away . . . THEN the Safety Car Control Equipment will speed up service while maintaining the basic element of safety.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK
WASHINGTON PITTSBURGH

Digitized by Google



A whole year's driving in less than a week!

FOR five and a half days and nights, through rain, through blistering heat, three Socony test cars—standard 1931 model sedans—raced around the torturing Indianapolis Speedway, testing the *new* Socony Motor Oil.

In less than a week, at close to a mile-a-minute pace, they covered 7,290 miles—a whole year's driving . . . the equivalent of driving uphill, throttle wide open, all the way! The test was made under the strict supervision of the American Automobile Association. The results surpassed the expectations of Socony engineers after two and a half years' work!

They already *knew* it was a great *Cold Weather Oil.* Tested at 6 below zero in an airplane flying over four and three-quarters miles high, this 100% Paraffine Base dewaxed oil flowed freely. But the Indianapolis test proved something more. It proved this *new* oil does not decompose regardless of engine heat. It proved that this *new* oil maintains the proper body at abnormally high engine temperatures, giving perfect piston seal, maximum power, and minimum fuel and oil consumption; and that the new refining process reduces to a minimum all harmful elements which cause carbon, gum and sludge.

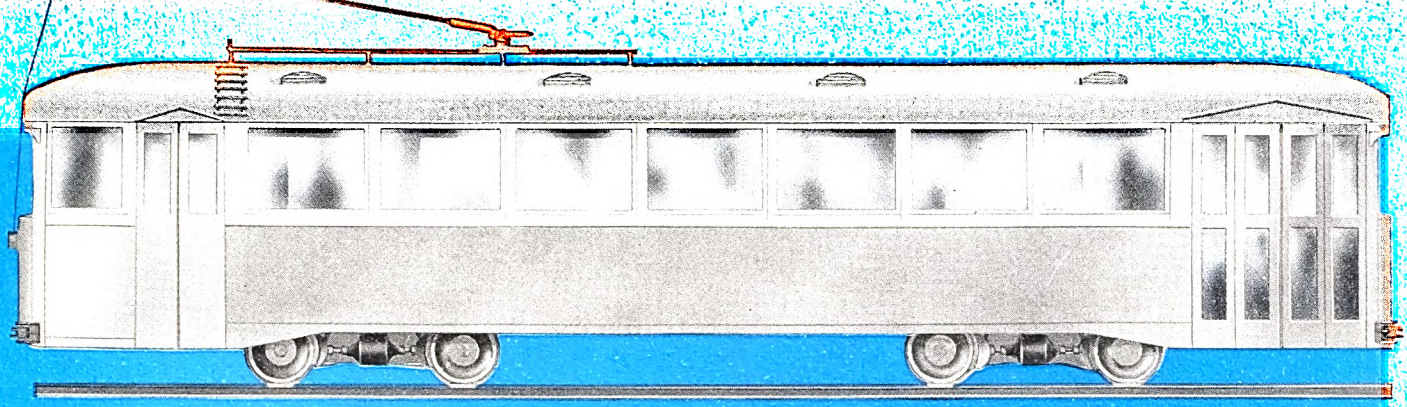
Bus owners, too, will find that the *new* Socony Motor Oil is even better in buses than Socony "Aircraft"—in fact, the ideal lubricant. We urge you to try it today.

STANDARD OIL COMPANY OF NEW YORK

Perfected . . proved . . in every way!

new SOCONY MOTOR OIL

Digitized by Google



Length of car over buffers 40′1⅜″.
Width of car at belt rail 8′3″.
Height rail to step 15″.
Height step to floor 13″.

Floor to headlining 7′2″.
Aisle width 25″.
Width of seat 34″.
Seat spacing 30″.

Single end car equipped with 4 motors 24,000 lb.
Double end car equipped with 4 motors 25,000 lb.

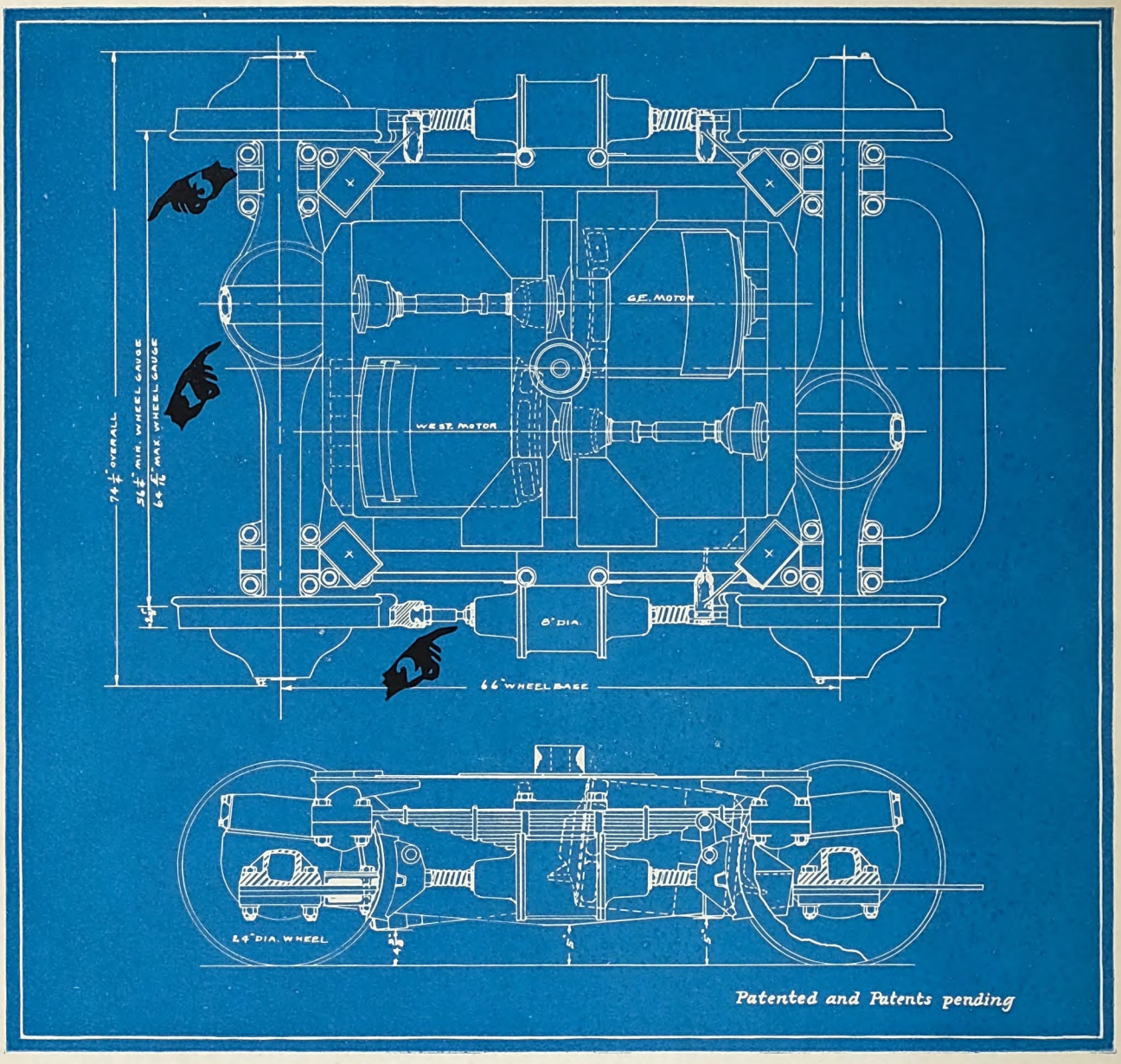
BUY EQUIPMENT

that can pay for itself out of the money it saves

THIS WILL EFFECT YOUR 1931 BUDGET

PURCHASE this new equipment and save approximately 10 per cent of the capital investment normally required for new cars and save about 17½% of your present operating expenses.

Digitized by Google



FEATURES:

1. Timken worm drive axles. Wheel diameter 24". Truck wheel base 5'6". Truck pivot centers 19'7".

2. Foot control of air brakes using cylinder on side of trucks, actuating conventional brake shoes directly on wheels. Shoes are adjusted from the outside with only two wrenches. All parts easily accessible for rapid inspection and maintenance.

3. Wheel gauge optional from 56 1/4" minimum to maximum of 64 5/16".

GENERAL CAR AND COACH CORPORATION

100 STATE STREET ◆ ALBANY, N. Y.

Digitized by Google

DAYTON TIES
and the
Human Equation

Complexity of installation methods is a strong point of objection to any product for any purpose.

In track work, particularly, good results depend upon the care and thoroughness of the actual work of the laborers.

Well planned methods often go wrong from laborers' carelessness.

A method which is proof against such mistakes is most desirable.

After twelve years of use and hundreds of installations of Dayton Ties, made by every known class of track laborers, the record shows not one case where the track foundation has failed or where the ties have become loose in their bed.

The simplicity and effectiveness of the Dayton method offsets the ever present human equation.

and they cost less.

❖

The Dayton Mechanical Tie Co.
Dayton, Ohio

Digitized by Google

You need *both*— The Journal *plus* The News

THE monthly edition of *Electric Railway Journal* gives you comprehensive articles on changing trends, technical advances and broad problems facing the industry.

And the E.R.J. *News*—the newspaper of the field—presents terse, accurate news dispatches of fare changes . . court decisions . . financial and corporate notes . . new legislation . . association meetings . . personal notes . . all the vital news of the industry.

You need BOTH for a complete picture of the electric railway field. If you read only the monthly magazine, you miss the current news of the industry . . accurate, vital, fresh . . gathered by telegraph with newspaper speed. If you read only the *News,* you don't receive the benefit of the interpretive editorials, the authoritative articles, the maintenance and operating data of the *Electric Railway Journal* monthly magazine.

Subscription price of the E.R.J. *News* is low—only $2 for the complete year's service of thirty-nine issues (it appears on thirty-nine Saturdays during the year). Foreign rate, $4 a year. Sold in combination with the monthly edition of *Electric Railway Journal* for $5 a year domestic and $9 foreign.

Send no money now. Simply fill out the coupon below —and mail it today! Give yourself a bird's-eye view of the entire electric railway field.

Just tear off, fill in and mail this coupon today!

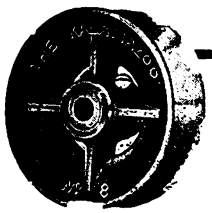
ELECTRIC RAILWAY JOURNAL
10th Ave. at 36th St., New York

Check one:

☐ Enter my subscription to the Electric Railway Journal NEWS and send me a bill for $2. (Foreign rate: $4 year).

☐ Enter my subscription to both the Electric Railway Journal monthly magazine and the separate NEWS service. Bill me for $5.

Digitized by Google



IT ISN'T ALL FUN FOR A TROLLEY WHEEL

IT'S easy for any trolley wheel to run smoothly and provide ample conductivity in balmy weather.

But when rain, snow, and sleet whip trolley wires, it isn't fun for trolley wheels.

That's where Kalamazoo Trolley Wheels prove their value. Ample conductivity is always present for those who standardize on Kalamazoo Trolley Wheels.

It is significant that many Electric Railway Companies use them as a basis for comparison.

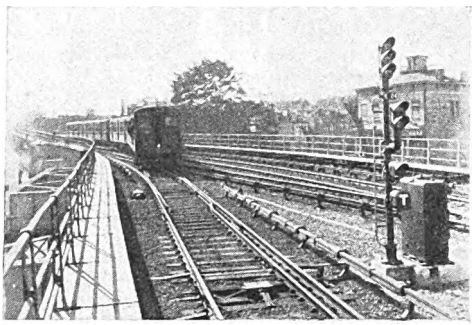
Write for details and bulletins.

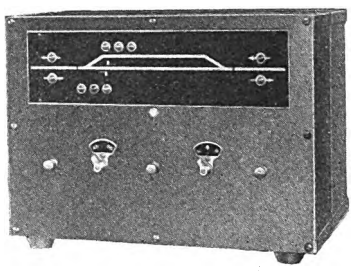
THE STAR BRASS WORKS

KALAMAZOO, MICHIGAN

KALAMAZOO

Centralize Traffic Control





THE control of all traffic over a busy line, whether the line is a mile long or thirty or forty, can be centralized into the hands of one operator. All information necessary for the manipulation of the levers is brought to him in the most accurate manner.

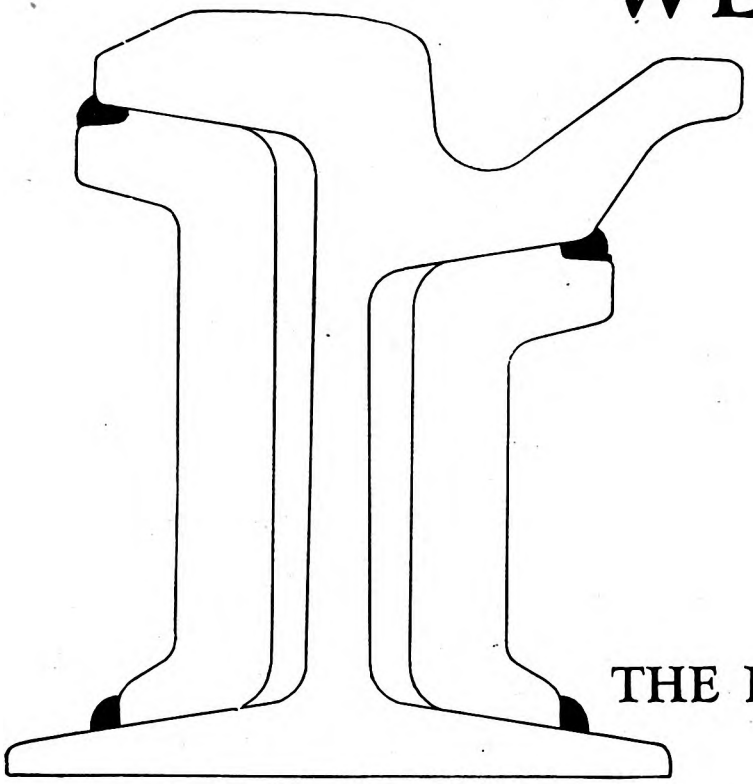
Centralized Traffic Control is adaptable to a complex urban traffic system or to a long interurban line. It carries a maximum number of controls and indications over a minimum number of line wires. Such control is proving to be a great time saver and economy producer on more than 80 installations.

1881 TRADE US MARK **Union Switch & Signal Co.** TRADE US MARK 1930

SWISSVALE, PA.

Digitized by Google

"WELD PLATES"



For EFFICIENT, ECONOMICAL

JOINTS

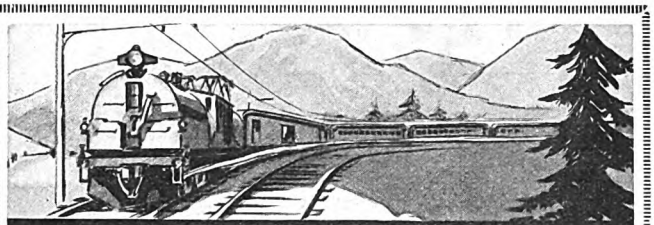
Do you believe in statistics? Rely on performance records? If so, the performance records of the many "Weld Plates" now in use will convince you that they lead the bar-weld joints in efficiency and economy.

"Weld Plates" represent the most modern welding practice. They are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

A trial will convince you of their efficiency and economy.

THE RAIL JOINT COMPANY

165 Broadway, New York



Roebling
Electrical Wires & Cables

Quality Products

From the finest Magnet Wire to Largest Power Cables.

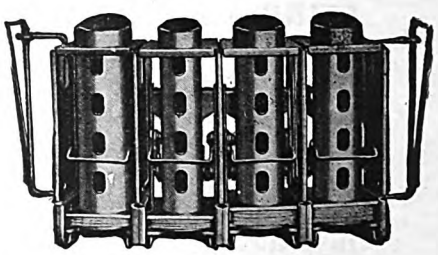
John A. Roebling's Sons Company, Trenton, N. J., Makers of Wire Rope and Wire

JOHNSON FARE COLLECTING SYSTEMS

Johnson Electric Fare Boxes and overhead registers make possible the instantaneous registering and counting of every fare. Revenues are increased 1½ to 5% and the efficiency of one-man operation is materially increased. Quicker boarding of passengers with resultant reduction in running time for the buses. Over 5000 already in use.

When more than three coins are used as fare, the Type D Johnson Fare Box is the best manually operated registration system. Over 50,000 in use.

Johnson Change-Makers are designed to function with odd fare and metal tickets selling at fractional rates. It is possible to use each barrel separately or in groups to meet local conditions. Each barrel can be adjusted to eject from one to five coins or one to six tokens.



Johnson Fare Box Co.

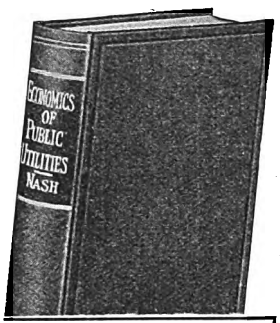
4619 Ravenswood Ave., Chicago, Ill.

Digitized by Google

Your name stamped FREE on this book

At no additional cost, we will stamp your name or the name of a friend in gold on the front cover of every copy of Nash's **Economics of Public Utilities** ordered from this advertisement. This is a special Christmas offer, limited to acceptance before January 1, 1931.

a comprehensive treatment of the business and economic problems of public utilities



This book presents the essential facts and the most mature view upon the underlying financial and economic phases of public utility companies, with particular emphasis on electric railways, electric light and power companies and gas companies.

Economics of Public Utilities

By L. R. NASH
Public Utility Engineer, Stone and Webster, Inc.
413 pages, 6x9, $4.00

This book discusses every angle of the public utility as a business and treats thoroughly such subjects as capitalization, investment features, franchises, regulation, valuation, depreciation, taxes, rates, service, accounting methods, public relations, etc.

Mr. Nash has drawn from his experience of more than twenty-five years in the business of designing, constructing and managing public utility properties for the data on which this book is based. The comprehensive view it offers of the business and economic phases of public utility enterprises will be of value to utility officials, bankers, investors, engineers, lawyers, accountants, public officials and the economist and business man.

CONTENTS:
1.—Origin and Development of Public Utilities. 2.—Distinguishing Characteristics of Public Utilities. 3.—Franchises. 4.—Capitalization. 5.—Accounting Methods. 6.—Regulation. 7.—Valuation. 8.—Depreciation. 9.—Rate of Return to Investors. 10.—Rate Structures. 11.—Taxation. 12.—Tests of Utility Securities as Investments. 13.—Tests of Utility Development. 14.—Public Ownership. 15.—Public Relations. 16.—Some Current Utility Problems. 17.—Views on Outstanding Issues.

Do you want to make a friend a gift that combines personal thoughtfulness with real utility? Do you want a copy of Nash that you will doubly prize? Then take advantage of this free stamping offer. Send the coupon today. Remittance should be enclosed with order, and, of course, stamped books are not returnable.

SPECIAL HOLIDAY OFFER COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City:

Send me Nash—Economics of Public Utilities, with name below stamped in gold. I enclose $4.00 and understand that stamped books are not returnable. (This offer expires Jan. 1, 1931.)

.....
(Name for stamping. Please print)

Name .....

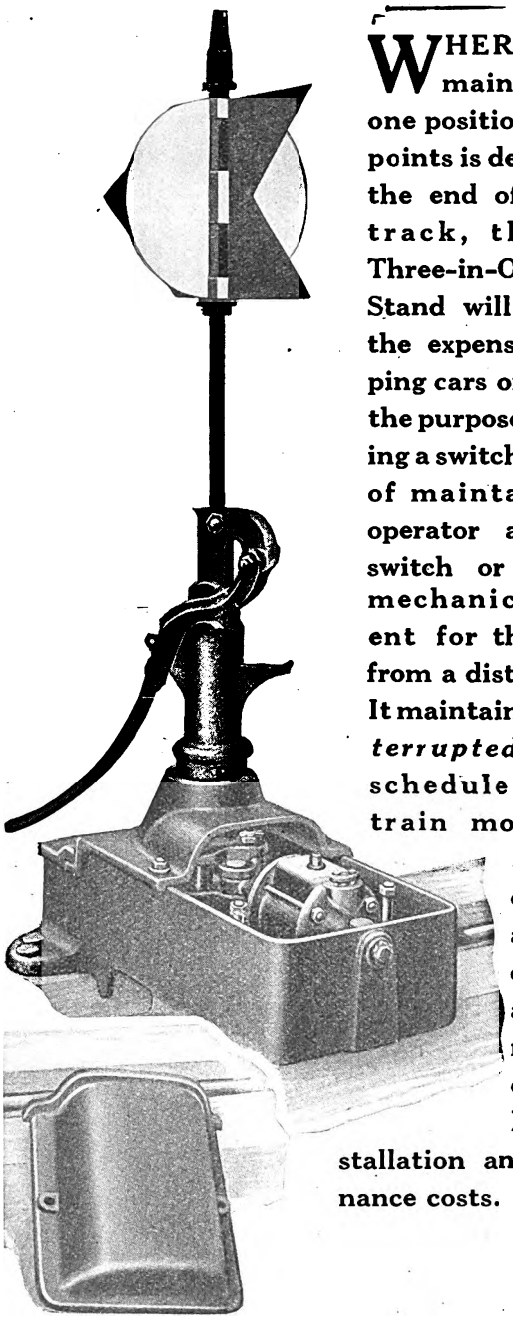
Address .....

City and State .....

E. 12-30

FOR THE ACCOMPLISHMENT OF ECONOMY WITH SAFETY . . . . .

The New Racor Three-in-One Switch Stand



WHEREVER the maintenance of one position of switch points is desired, as at the end of a double track, the Racor Three-in-One Switch Stand will eliminate the expense of stopping cars or trains for the purpose of throwing a switch or the cost of maintaining an operator at such a switch or expensive mechanical equipment for throwing it from a distant tower. It maintains an *uninterrupted* routine schedule of car or train movements; safeguards equipment at these locations and promotes economies in lowered installation and maintenance costs.

Behind Racor Service stand nine plants specializing in the manufacture and distribution of railroad track turnout and crossing equipment, including Manganese Work for heavy traffic.

RAMAPO AJAX CORPORATION
RACOR PACIFIC FROG AND SWITCH COMPANY, Los Angeles - Seattle
CANADIAN RAMAPO IRON WORKS, LIMITED, Niagara Falls, Ontario

General Offices — 230 PARK AVENUE, NEW YORK
SALES OFFICES AT WORKS, AND
McCORMICK BUILDING, CHICAGO
METROPOLITAN BANK BLDG., WASHINGTON
BUILDERS EXCHANGE BLDG., ST. PAUL

Mine Racor Works
Hillburn, New York, Niagara Falls, N.Y. Chicago, Illinois, East St. Louis, Ill. Superior, Wis. Pueblo, Col. Los Angeles, Cal. Seattle, Wash. Niagara Falls, Ont.

Digitized by Google

REFLEX Signs and Symbols

Optical construction permits 75% of the light striking the lens being returned to source from whence it came in sharp distinct outline.

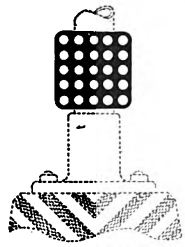
Clearly visible by day and gleaming at night as though illuminated by electricity. Command instant attention of enginemen or motorists.

Durable, non-shattering, made of solid glass.

Constructed and assembled of individual lens mounted in aluminum casting and allowing easy replacement.

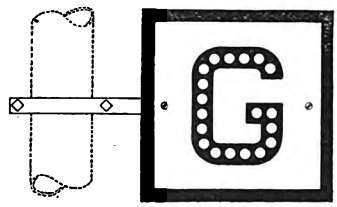
Hermetically sealed units giving lasting efficiency.

Bulletin 23 fully describes. Ask for your copy.



W-17A WARNING UNIT

The unit consists of 25 No. 1 lens mounted in aluminum casting and for use in center of streets, crossing signals, gates and miscellaneous obstructions.



L-5 GRADE SIGNAL

A 10 in. aluminum "G" casting studded with 19 No. 1 lens and mounted on a 16 in. square 12 gauge steel plate.

W-101 R. R. WARNING SIGN

Two 6 in. aluminum letters studded with 14 No. 1 lens each and mounted on a standard single track sign.

NIGHT INDICATION

Showing how car headlights will illuminate the L-5 signal at night.

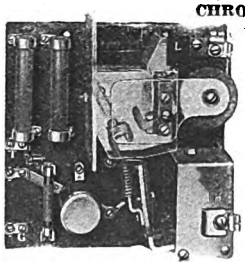
Louisville Frog, Switch & Signal Co.

LOUISVILLE, KENTUCKY

Utility Car Heaters fitted with

ENCLOSED HEATING elements carry the Underwriters' Laboratories Label. They give 100% energy output for what you put in.

CHROMALOX STRIP



NO. 10 REGULATOR

UTILITY HEAT REGULATORS economize in current consumption.

UTILITY HONEYCOMB VENTILATORS keep the air pure and wholesome.

Car Comfort with Utility Heaters Regulators Ventilators

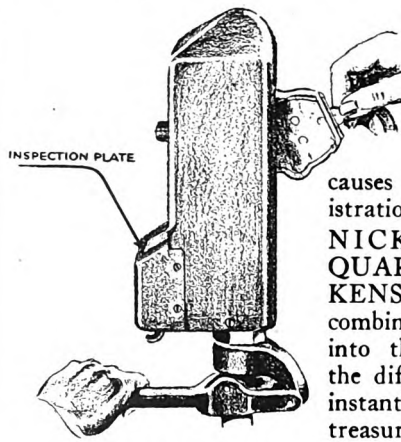
RAILWAY UTILITY COMPANY

2241-47 Indiana Ave., Chicago

J. H. DENTON, *Eastern Mgr.*

1328 Broadway, New York

Fare Collection,

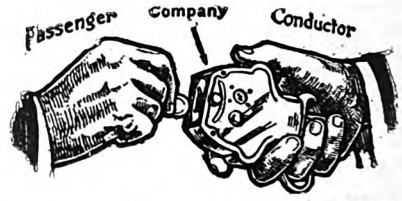


to avoid the old temptations and leaks, *necessitates the coin-slot mechanism.*

Coin - insertion causes *instantaneous* registration *by the patrons.* NICKELS, DIMES, QUARTERS or TOKENS—all or in various combinations, are paid into the *one* coin-slot—the different values being instantly assured your treasury.

MONEY METERS are furnished in either *portable* or *stationary* form and are mechanically unbeatable for trolleys and buses.

This *at-the-source* protection will probably add 4% to 10% to your present passenger income.



Money-Meters, Inc. (Successor to Rooke Automatic Register Co.)

3209 Book Tower, Detroit, Mich.

Digitized by Google

OKOCORD

MAKES IDEAL MOTOR LEADS

TOUGH, KINK-PROOF, WATERPROOF oil, acid, alkali resistant and very flexible...these properties make OKOCORD ideal for motor leads.

For this purpose, OKOCORD is made with extra flexible conductors, each wire being carefully tinned. The whole conductor is then wrapped with a paper separator to keep the rubber away from it, which facilitates skinning and soldering. The tough, tread-rubber sheath insulates and protects the conductor from all external damage.

If you haven't used it for this purpose, send for a trial order and learn for yourself how economical it is.

OKONITE PRODUCTS

Okonite Insulated Wires and Cables

Varnished Cambric Cables

Okonite Insulating Tape

Manson & Dundee Friction Tapes

Okocord

Okoloom

OKONITE-CALLENDER PRODUCTS

Impregnated Paper Cables

Super-tension Cables

Splicing Materials

THE OKONITE COMPANY

Founded 1878

THE OKONITE-CALLENDER CABLE COMPANY, INC.

Factories: Passaic, N. J. Paterson, N. J.

SALES OFFICES:

NEW YORK CHICAGO PHILADELPHIA PITTSBURGH ST. LOUIS
BOSTON ATLANTA BIRMINGHAM SAN FRANCISCO
LOS ANGELES SEATTLE DALLAS

Novelty Electric Co. Philadelphia, Pa.

F. D. Lawrence Electric Co. Cincinnati, O.

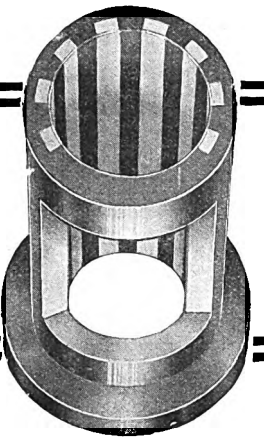
Canadian Representatives: Engineering Materials, Limited, Montreal

Cuban Representatives: Victor G. Mendoza Co., Havana

"NATIONAL PRODUCTS"

give you the kind of service that means true operating economy

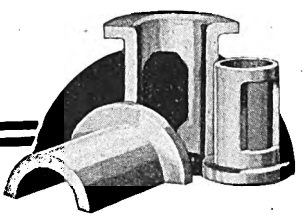
The Vigne



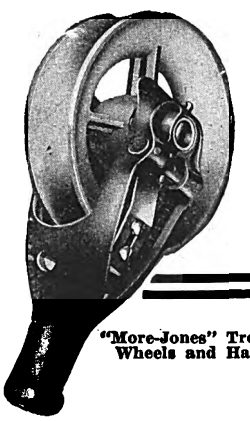
Bimetallic Armature Bearing

Our engineering department, because of its experience, can be of real benefit to you. Prices and full details will be submitted upon request.

"Armature" Babbitt Metal



"Tiger" Bronze Axle and Armature Bearings



"More-Jones" Trolley Wheels and Harps

NATIONAL BEARING METALS CORP.

St. Louis, Mo.

New York, N. Y. Meadville, Pa.

Jersey City, N. J. Portsmouth, Va.

Pittsburgh, Pa. St. Paul, Minn.

Digitized by Google

FABRICATED STRUCTURAL STEEL

For all kinds of BRIDGES and BUILDINGS

AMERICAN BRIDGE COMPANY

Subsidiary of United States Steel Corporation

Manufacturers of

STEEL STRUCTURES

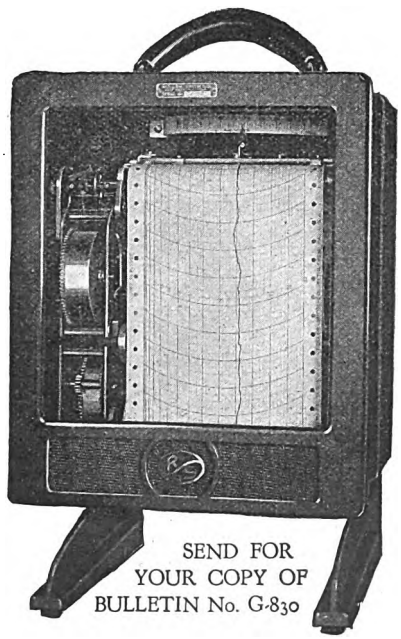
for every purpose

General Office: 71 BROADWAY, NEW YORK, N. Y.

Offices in principal cities

ROLLER-SMITH Announced GRAPHICS

Just Seven Months Ago



SEND FOR YOUR COPY OF BULLETIN No. G-830

In the short time since then the many outstanding features of this new line have been recognized and appreciated by many very particular engineers and large numbers of R-S Graphics are giving fine service under all sorts of trying conditions.

The line comprises switchboard, portable and wall models, A.C. and D.C., ammeters, voltmeters, wattmeters, power-factor meters and special devices for special applications.

Forty years' experience is back of

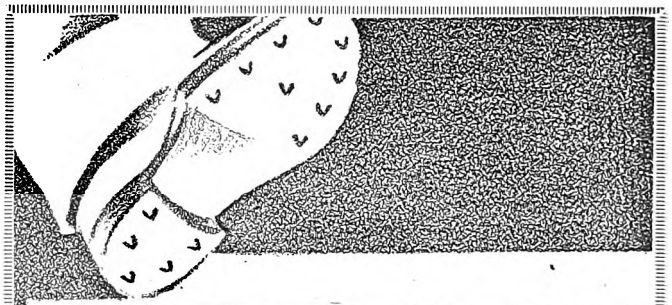
ROLLER-SMITH COMPANY

Electrical Measuring and Protective Apparatus

MAIN OFFICE
2140 Woolworth Bldg., New York

WORKS
Bethlehem, Penn.

Offices in principal cities in U. S. A. and Canada



TUCOLITH FLEXOLITH

Long Wearing

Even the rough brogans of stamping workmen do not injure the hard, tough surface of Tucolith floors.

6 REASONS WHY

Tucolith is the popular flooring material for cars and busses.

1. Long Life
2. Attractive
3. Non-Slip Surface
4. Fireproof
5. Sound Deadence
6. Sanitary

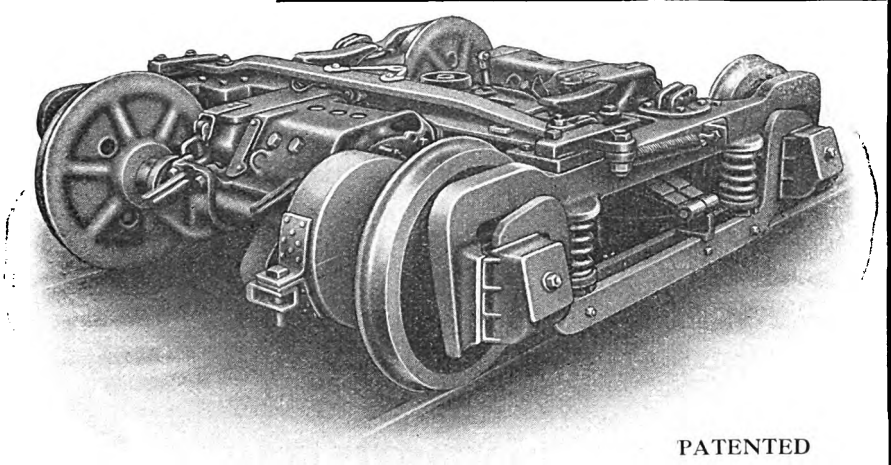
TUCO PRODUCTS CORP.
30 CHURCH ST., NEW YORK
PEOPLES GAS BLDG.,
122 S. MICHIGAN AVE., CHIGAGO

Digitized by Google

COMMONWEALTH TRUCKS

"SWING MOTION TYPE"

The end of every year shows lowered operating Costs with these Trucks



PATENTED

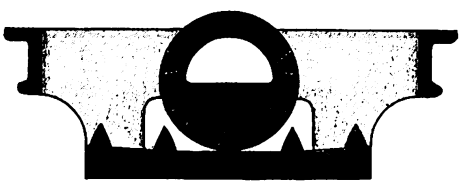
They are therefore worth investigating now. Learn about their features and how they will save money for you on repairs and costly maintenance. Here is one feature—the cast steel frame including cross transoms and pedestals is one strong unit.

General Steel Castings Corp.

Eddystone Penna. Granite City Illinois

STUCKI SIDE BEARINGS

SPECIAL CARBON STEEL
HEAT TREATED



LARGE WEAR SURFACES
FREE ROLLER
ONLY TWO PARTS

A. STUCKI CO.
OLIVER BLDG., PITTSBURGH, PA.

Canadian Representative
The Holden Co., Ltd., Montreal, Canada

Right on top of this maintenance problem

DIXON'S Bright Aluminum Paint

. . . for car roofs

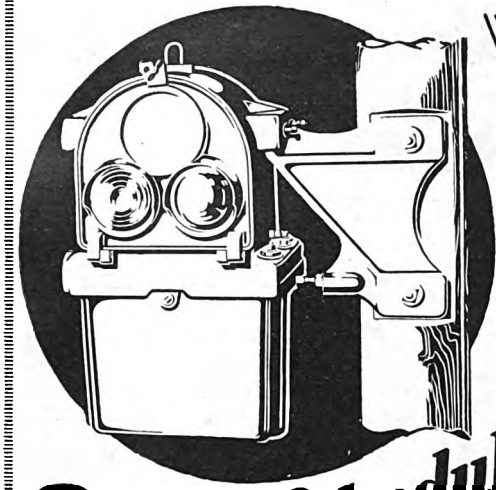
Electric railway operators using DIXON'S Bright Aluminum Paint have been able to cut down one big item of excessive maintenance. And they have transferred a maintenance overhead to the revenue-building side of their ledgers. They are painting car roofs with Bright Aluminum.

Here is two-fold value in a single investment—the tremendous durability of the straight aluminum pigment in a tough vehicle of spar varnish which insures long service life and low cost per year of service—and the enduringly bright, non-discoloring appearance which attracts patronage.

Try it the next time your cars go in the shop for repainting. You can brush it or spray it on, easily, quickly.

JOSEPH DIXON CRUCIBLE CO.
Est. 1827
Jersey City New Jersey

Digitized by Google



Faster Schedules

Nachod Automatic Block Signals, operating independently of the train crew, insure safe, fast operation and eliminate vexatious delays at switches. They take chance and memory out of the picture . . . provide maximum safety under all conditions of operation. Block and Highway Crossing Signals, Headway Recorders. Nachod & U. S. Signal Co., Inc., Louisville, Ky.

"Nachod Spells Safety"

NACHOD SIGNALS

PANTASOTE

TRADE MARK

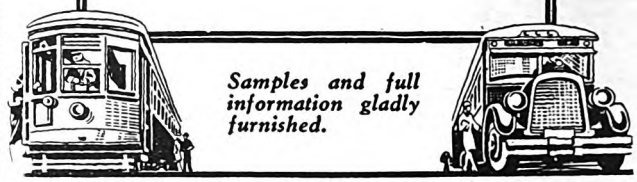
—the car curtain and upholstery material that pays back its cost by many added years of service. Since 1897 there has been no substitute for Pantasote.

AGASOTE

TRADE MARK

—the only panel board made in one piece. It is homogeneous and waterproof. Will not separate, warp or blister.

Standard for electric railway cars and motor buses



Samples and full information gladly furnished.

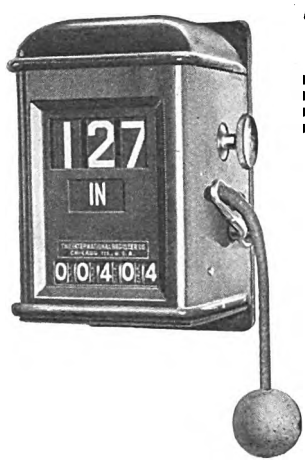
The PANTASOTE COMPANY, Inc.
250 Park Avenue NEW YORK

January Annual Statistical and Progress Number Closes December 22nd

Early receipt of copy and plates will enable us to serve you best—to furnish proofs in ample time so changes or corrections may be made if desired.

Electric Railway Journal.

New mechanical features guard against leaks



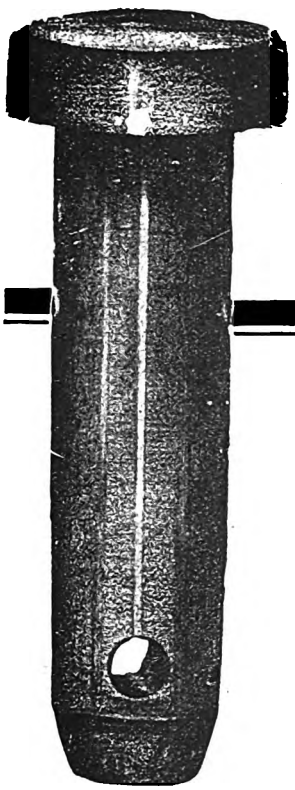
The R-13 INTERNATIONAL BUS REGISTER

Will increase your fare collections 2 to 5%. Accept our free trial offer and make these savings for yourself. Write for details.

THE INTERNATIONAL REGISTER COMPANY
17 South Throop Street, Chicago

Digitized by Google

A maintenance plan is for the "long run" Boyerized Parts fit!



No make-shift materials should enter any well conceived electric railway maintenance plan. For there are two known factors which must always be faced. The extraordinary wear to which each part is subjected, and the necessity for increasing the interval between jobs.

Boyerized Parts are made by special process to fit the plan which is based on "long runs" between repair jobs. They last three or four times longer than ordinary parts. In addition they . . . 1. Reduce replacements, 2. Cut labor costs, 3. And prevent costly break-downs.

Make Boyerizing a part of your maintenance plan. Check the list and send us a trial order today.

BEMIS CAR TRUCK COMPANY

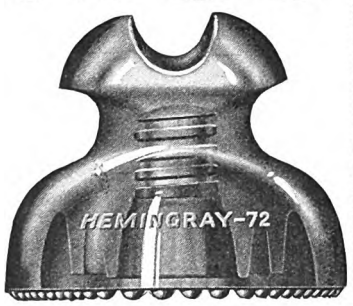
Electric Railway Supplies, SPRINGFIELD, MASS.

REPRESENTATIVES:
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 62-66 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 519 Delta Building, Los Angeles, Cal.

- Brake Pins
- Brake Hangers
- Brake Levers
- Pedestal Gibs
- Brake Fulcrums
- Center Bearings
- Side Bearings
- Spring Post Bushings
- Brake Bushings
- Bronze Bearings
- Bolster and Transom Chafing Plates
- Spring Posts
- McArthur Turnbuckles
- Manganese Brake Heads
- Manganese Truck Parts

YES ~ ~ ~ Glass

—UP TO 15,000 VOLTS



There are five good reasons—each one a valid reason for using Hemingray glass insulators on all of your medium voltage lines — Get our catalog — it explains them fully.

HEMINGRAY

HEMINGRAY GLASS COMPANY

General Offices and Factory Muncie, Indiana

"VELVELEA"

. . . a full grain serviceable leather originated to replace fabrics in transportation service. It possesses effects heretofore not obtainable in leather, yet it retains full grain appearance and softness. Non-fading, durable and easily cleaned.

Samples on request.

America's Largest Producer

GENERAL LEATHER CO.
Newark, N. J.

Makers of the Famous Tried and Proven "00" Leathers

Detroit Office:
General Leather Co.,
414 Fisher Bldg.

West Coast Office:
A. J. & J. R. Cook, Inc.,
237 Eighth St., San Francisco

London Office:
R. & A. Kohnstamm, Ltd.,
21 West Smithfield,
London, E. C.

Canadian Office:
Colonial Traders, Inc.,
277 William St., Chatham, Ont.

Digitized by Google

ENGINEERS and CONSULTANTS

Ford, Bacon & Davis
Incorporated

Engineers

39 Broadway, New York
PHILADELPHIA CHICAGO
SAN FRANCISCO

ALLIED ENGINEERS, Inc.

Engineers and Constructors

120 Wall Street
New York

Transportation Examinations and Reports

THE BEELER ORGANIZATION
Engineers and Accountants
JOHN A. BEELER, DIRECTOR
Traffic — Traction
Bus-Equipment
Power-Management
Appraisals Operating and Financial Reports
Current Issue LATE NEWS and FACTS free on request
52 Vanderbilt Avenue, New York

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS

EXAMINATIONS
REPORTS-APPRAISALS-RATES
OPERATION-SERVICE

C. B. BUCHANAN, President
W. H. PRICE, JR., Sec'y-Treas.
JOHN F. LAYNG, Vice-President
Buchanan & Layng Corporation
Engineering and Management, Construction, Financial Reports, Traffic Surveys and Equipment Maintenance
BALTIMORE
1004 First National Bank Bldg.
NEW YORK
49 Wall Street
Phone: Hanover: 2142

J. ROWLAND BIBBINS
CONSULTING ENGINEER
TRANSPORTATION
UTILITIES
Transit-Traffic Development Surveys. Street Plans, Controls, Speed Signals. Economic Operation, Schedule Analyses, Bus Co-ordination, Rerouting. Budgets, Valuation, Rate Cases and Ordinances.
EXPERIENCE IN 25 CITIES
2301 Connecticut Avenue
Washington, D. C.

R. F. KELKER, Jr.
CONSULTING ENGINEER
111 W. WASHINGTON ST., CHICAGO

TRANSIT DEVELOPMENT
OPERATING PROBLEMS—
TRAFFIC SURVEYS
VALUATIONS

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells
Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management
Operation Construction
50 East 42nd St., New York City

BYLLESBY ENGINEERING and MANAGEMENT CORPORATION

231 S. La Salle Street, Chicago
New York Pittsburgh San Francisco

SANDERSON & PORTER
ENGINEERS
for the
FINANCING—REORGANIZATION
—DESIGN—CONSTRUCTION
of
INDUSTRIALS and
PUBLIC UTILITIES
Chicago New York San Francisco

The P. Edward Wish Service
50 Church St., NEW YORK
Street Railway Inspection
DETECTIVES
131 State St., BOSTON

WALTER JACKSON
Consultant on Fares
and Motor Buses
The Weekly and Sunday Pass
Differential Fares—Ride Selling
Suite 6-A
616 E. Lincoln Ave., Mt. Vernon, N. Y.

Digitized by Google

SEARCHLIGHT SECTION

EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or SPECIAL

UNDISPLAYED—RATE PER WORD:

Positions Wanted. 5 cents a word, minimum $1.00 an insertion, payable in advance.

Positions Vacant and all other classifications, excepting Equipment, 10 cents a word, minimum charge $2.00.

Proposals. 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 inch $6.00
2 to 3 inches ..... 5.75 an inch
4 to 7 inches ..... 5.50 an inch

Other spaces and contract rates on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page. R.J.

COPY FOR NEW ADVERTISEMENTS ACCEPTED UNTIL 3 P. M. ON THE 20TH FOR THE ISSUE OUT THE FIRST OF THE FOLLOWING MONTH

Track Dismantling

We dismantle electric, steam and industrial railroad trackage with neatness and dispatch. Can save you money. Wire or write

A. DUIE PYLE CONTRACTING CO.
1223 Widener Bldg., Philadelphia, Pa.

125 tons New but rusty
72 lb. 6 in. High "T" Rail
60 and 62 ft. lengths
ZELNICKER IN ST. LOUIS
at less than Mill Price

Turn your idle machinery into CASH through a "Searchlight" advertisement

FOR SALE
1000 K.W.
SYNCH. MOTOR GEN. SET
Modern type Westinghouse 575 v. D.C. 3 ph., 60 cy., 2,200 v., .8 P.F., A.C. 900 r.p.m. Motor Generator Set with Dir. Conn. Exciter and complete A.C. and D.C. Switchboards. Condition 95% New.
JOHN D. CRAWBUCK COMPANY
Empire Bldg., Pittsburgh, Pa.

New and Relaying Rails

All Weights and Sections

We specialize in buying and dismantling entire railroads and street railways. Also industrial and public service properties which have ceased operation. We furnish expert appraisals on all such properties.

May We Serve You?

The Perry, Buxton, Doane Company

(Capital $1,000,000.00)

General Department, P. O. Box 5253, Boston, Mass.

Pacific Sales Office—Failing Building, Portland, Oregon

POSITION VACANT

GRADUATE electrical engineer, age 34, with 11 years' experience in electric railway and gas industry, desires connection with operating company. Experienced in construction work, operation of transportation and mechanical departments and investigation of methods used with recommendations for improvement. Present work will be completed about January 1st. P-235, Electric Railway Journal, 520 No. Michigan Ave., Chicago, Ill.

POSITIONS WANTED

ARMATURE winder well experienced with railway equipment desires change. Reference. PW-217, Electric Railway Journal, 883 Mission St., San Francisco, Calif.

MASTER mechanic, now employed desires change. Good reference. Experienced interurban, city car and bus maintenance and overhauling. PW-227 Electric Railway Journal, 520 No. Michigan Ave., Chicago, Ill.

SUPERINTENDENT transportation, broad experience, successful record dealing with labor, public, increasing revenue, decreasing costs. Now engaged, desires making a change. Available short notice. Can go anywhere. PW-234, Electric Railway Journal, Tenth Ave. at 36th St., New York.

ADVERTISING man, thoroughly experienced; creative copywriter, reporter, correspondent, salesman; unquestioned ability. Manuel Shapiro, 2039 East Twelfth Street, Brooklyn, New York.

FREE BULLETIN

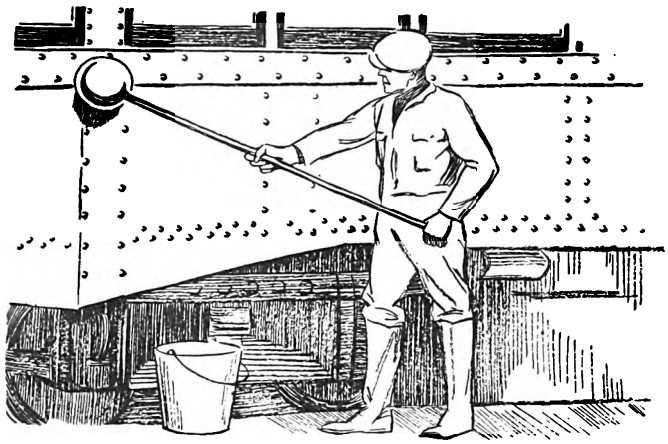
THE "Emerman Red Book"—No. 30—covering stocks of used and new machinery, tools and supplies—just issued. Lists, with prices, over 275 varieties machine tools, shop and plant equipment classified, illustrated and indexed; 260 pages, 4x9 with stiff board cover; suitable for reference file. Write Louis E. Emerman & Co., 1761 Elston Ave., Chicago, Ill.

Your Best Market
for
Old Trolley Cars and Equipment
Reliable Service

L. SCHIAVONE & BONOMO BROS., Inc.

Jersey City New Jersey

Digitized by Google



Scheduled cleaning preserves surfaces and saves money

CLEANING cars and busses at the end of each day's run is an economical measure that helps preserve painted surfaces and maintains their attractive appearance.

A growing number of railway and bus fleet superintendents have found that the Oakite way of doing this is both economical and effective. Road dirt, grease, and spots are removed *without injury to painted wood or metal surfaces.* The emulsifying action of the Oakite solution breaks up the grime so that a cold water rinse leaves paintwork film-free and without signs of streaks. Original brilliancy is preserved, and the intervals between repainting become noticeably longer.

Full information on economical Oakite materials and methods for this and other electric railway cleaning jobs is contained in our booklet, "Oakite for Railroads." If you operate a bus fleet you will also profit from our booklet, "Oakite for Garages, Service Stations and Repair Shops." Write for your copies. No obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Manufactured only by
OAKITE PRODUCTS, INC., 28B Thames Street, NEW YORK, N. Y.

OAKITE
TRADE MARK REG. U. S. PAT. OFF.
Industrial Cleaning Materials and Methods

ALPHABETICAL INDEX

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Electric Railway Journal* assumes no responsibility for errors or omissions.

Allied Engineers 80
Aluminum Co. of America ..... Insert 57-58
American Brake Shoe & Foundry Co 83
American Bridge Co 76
American Car Co ..... Third Cover
American Steel Foundries 38-39
American Steel & Wire Co 44
American Tel. & Tel. Co 41

Beeler Organization 80
Bemis Car Truck Co 79
Bender Body Co., The 84
Bethlehem Steel Co 59
Bibbins, J. Roland 80
Brill Co., The J. G ..... Third Cover
Buchanan & Layng Corp 80
Byllesby Eng. & Manag. Corp 80

Carnegie Steel Co 52
Cities Service Co 36-37
Collier, Inc., Barron G 29
Consolidated Car Heating Co 31

Dayton Mechanical Tie Co., The 69
De Vilbiss Co., The 56
Dixon Crucible Co., Joseph 77

Electric Service Supplies Co 5

Fargo Motors Corp ..... Insert 45-48
Ford, Bacon & Davis 80

General Car & Coach Corp ..... Insert 67-68
General Electric Co 16-17-18
General Leather Co 79
General Motors Truck Co ..... Insert 25-28
General Steel Castings Co 77
Globe Ticket Co 61
Goodrich Rubber Co., The B. F 55
Goodyear Tire & Rubber Co 20-21

Hale-Kilburn Co 12
Hemingray Glass Co 79
Hemphill & Wells 80
Heywood-Wakefield Co 23

Illinois Steel Co 32
International Motor Co ..... Back Cover
International Register Co., The 78
International Steel Tie Co 22

Jackson Lumber Co 49
Jackson, Walter 80
Johns-Manville Corp 53
Johnson Fare Box Co 72

Kelker, Jr., R. F 80
Kuhlman Car Co ..... Third Cover

Digitized by Google

Long Mfg. Co. ... 60
Lorain Steel Co. ... 11
Louisville Frog, Switch & Signal Co. ... 74

Mack Trucks, Inc. ... Back Cover
McGraw-Hill Book Co., Inc. ... 73
Metal & Thermit Corp. ... 14-15
Mica Insulator Corp. ... 40
Miller Trolley Shoe Co. ... 50
Money-Meters, Inc. ... 74

Nachod and U. S. Signal Co. ... 78
National Bearing Metals Corp. ... 75
National Brake Co., Inc. ... 19
National Carbon Co. ... 30
National Tube Co. ... 51

Oakite Products, Inc. ... 82
Ohio Brass Co. ... 8-9
Okonite Co., The ... 75
Okonite-Callender Cable Co., The ... 75

Pantasote Co., Inc., The ... 78

Rail Joint Co., The ... 72
Railway Track-work Co. ... 6-7
Railway Utility Co. ... 74
Ramapo Ajax Corp. ... 73
Richey, Albert ... 80
Roebling's Sons Co., John A. ... 72
Roller-Smith Co. ... 76

Safety Car Devices Co. ... 65
Sanderson & Porter ... 80
Searchlight Section ... 81
Standard Oil Co. (Indiana) ... 33
Standard Oil Co. of New York ... 66
Standard Steel Works Co. ... 63
Star Brass Works, The ... 71
Stoody Co. ... 13
Stucki Co., A. ... 77

Timken-Detroit Axle Co. ... 34-35
Timken Roller Bearing Co. ... Front Cover
Tuco Products Corp. ... 76

Union Metal Mfg. Co., The ... 24
Union Switch & Signal Co. ... 71

Wason Mfg. Corp. ... Third Cover
Westinghouse Elec. & Mfg. Co. ... Second Cover, 4
Westinghouse Traction Brake Co. ... 10
Wish Service, The P. Edw. ... 80

Yellow Coach ... Insert 25-28

Searchlight Section — *Classified Advertising*

EQUIPMENT (Used, etc.)
Crawbuck Co., John D. ... 81
Duie Pyle Contr. Co., A. ... 81
Perry, Buxton, Doane Co., The ... 81
Schiavone, L. & Bonomo Bros., Inc. ... 81
Zelnicker in St. Louis ... 81
POSITIONS VACANT AND WANTED ... 81

Quicker Stops ARE A Factor in Offering A Better Service

In these days of keen competition every operator is anxious to offer a fast, clean, comfortable service and one important factor in a fast service is quicker stops.

Ordinary brake shoes may have been satisfactory at one time but present day operating conditions make it necessary that the most efficient brake shoe obtainable be used.

"Diamond-S" brake shoes are the most efficient as well as the most economical to use in any service.

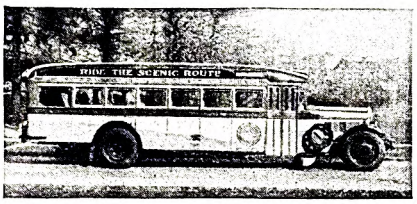
"DIAMOND-S" BRAKE SHOES

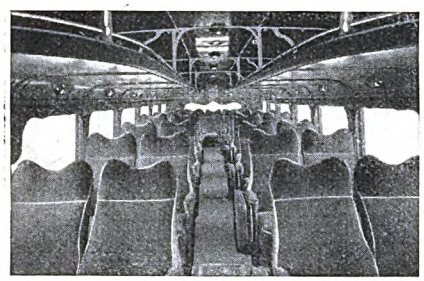
The American Brake Shoe and Foundry Company

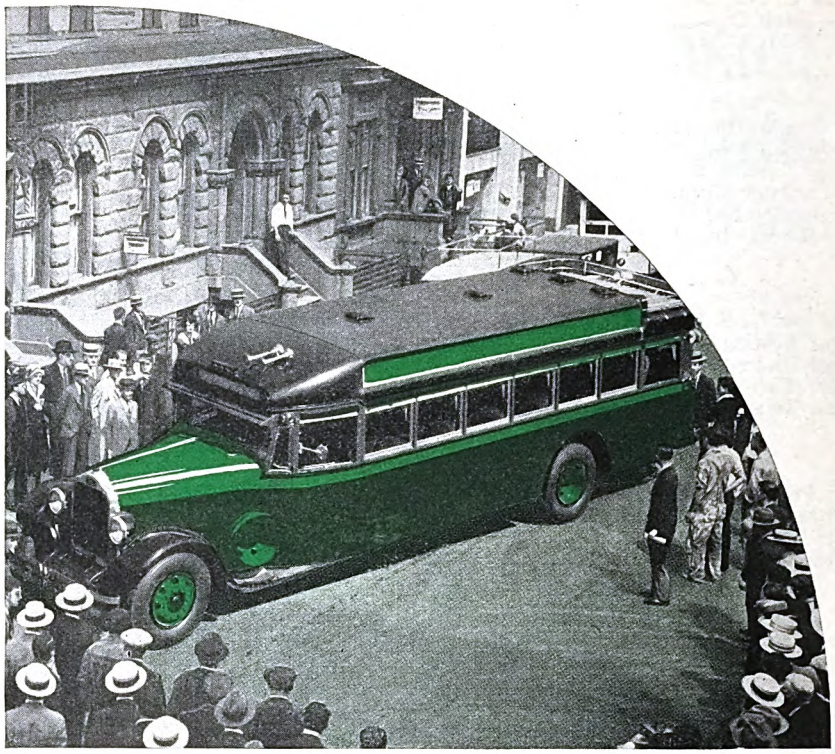
230 Park Ave., New York

332 So. Mich. Ave., Chicago

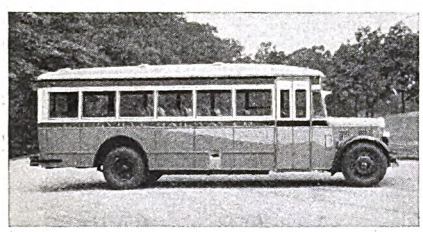
Digitized by Google

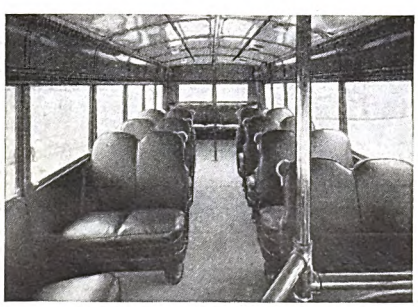






Every Day More People Travel In BENDER BODIES





UNQUESTIONABLY, riders are attracted by the graceful lines and beautiful appearance of Bender Buses . . . Exceptionally comfortable seats, good lighting, ventilation and wide aisles . . . in fact, everything possible inside for passenger comfort and safety makes them permanent riders.

What passengers cannot see, but equally important, are the factors of exceptionally sturdy construction, first quality materials carefully inspected, skillful fitting, secure jointing, rigid welding and extra reinforcement. These and many other important features are typical of Bender advanced construction, insuring safety for passengers and long-time running, giving operators better value per dollar invested.

No wonder that every day more people travel in Bender Bodies.

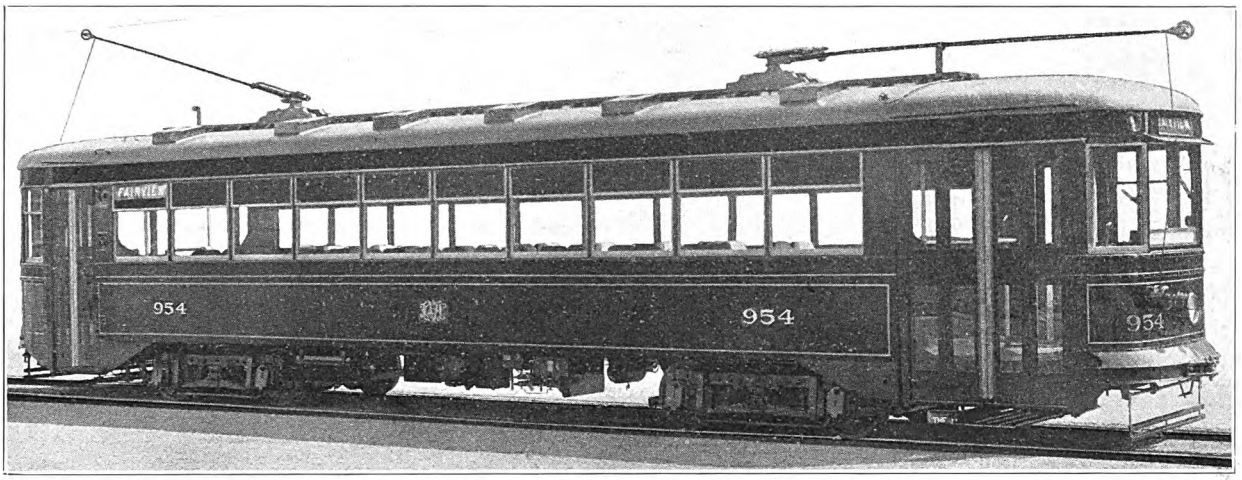
THE BENDER BODY COMPANY

W. 62nd and Denison Cleveland, Ohio

B·E·N·D·E·R ··· B·O·D·I·E·S

Digitized by Google

Allentown Introduces Ten New Double-end Cars



action

The number of cities recognizing that action is necessary if the modern public transportation problem is to be met is growing. As evidence we present the following recent new car installations:

New modern cars, faster schedules, with maximum comfort and convenience—the best way to meet present-day competition.

BALTIMORE	One hundred and fifty single-end front-entrance center-exit cars, mounted on Brill 177-E-1 Trucks.
SANTIAGO	Thirty double-end suburban cars on Brill 177-E-1-X Trucks.
YORK	Three double-end city cars mounted on the new Brill 84-E-1-X Trucks.
ALLENTOWN	Ten double-end cars mounted on Brill 177-E-1-X Trucks.

Recognition of the importance of new cars is one thing; placing them in service is another. Without action there can be no improvement.

The J. G. BRILL COMPANY

HARRIS TRUST BUILDING CHICAGO · PHILADELPHIA · RIALTO BUILDING SAN FRANCISCO

AMERICAN CAR CO., ST. LOUIS • THE G. C. KUHLMAN CAR CO., CLEVELAND • WASON MFG. CO., SPRINGFIELD, MASS.

Digitized by Google

LIBRARY-PERIODICAL DEPT
URBANA ILL 1ST-c

A SMALL CAPACITY Mack

17 passenger Interstate—21 passenger City Service

In the new small-capacity Mack BG, operators can now obtain a light, flexible yet husky bus, *ESPECIALLY* designed for light runs in city service; on interurban routes and for school work.

For the first time Mack quality is available in a small bus, assuring long life, reliability, minimum depreciation, low maintenance, and those low costs that are so essential on thin lines.

The Mack BG assures lower costs and increased profits in the small-capacity field as surely as other Mack models always have in larger-capacity service.

MACK MODEL BG
Six-cylinder 70 h.p.
183" wheelbase
Completely MACK-Built Body and Chassis

This model completes the Mack line . . . there is a Mack for every need.

MACK TRUCKS, Inc.
25 Broadway
New York

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

UNIVERSITY OF ILLINOIS-URBANA
3 0112 098039743

Digitized by Google